AMERICAN FRUIT GROWER

Vol. XL
No. 1

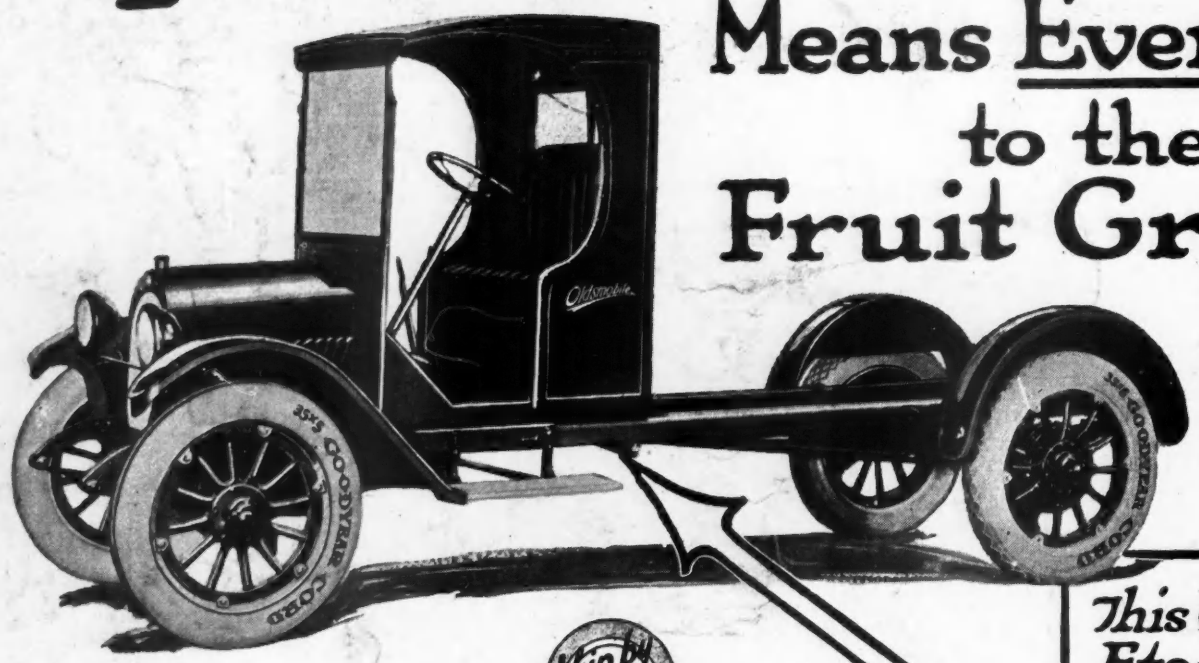
January 1920

Ten Cents
A Copy

Edited by Samuel Adams

Speed without Damage

Means Everything to the Fruit Grower



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A quick haul on pneumatic tires—the Oldsmobile Economy Truck way—saves many dollars per load and mile. It is rapid transportation constantly available from orchard, vineyard or berry patch to consumer or railroad.

Fruit Growers are quickly adopting the Oldsmobile Economy Truck. It is light in weight—it gets there at the lowest cost because there is no drag of excess weight. There is a daily saving in gas, oil, tires and upkeep.

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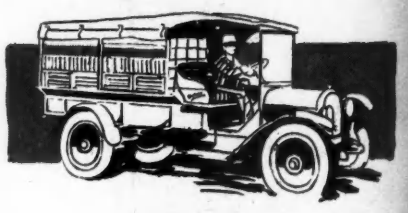
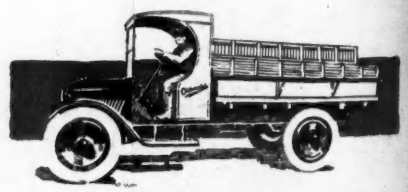
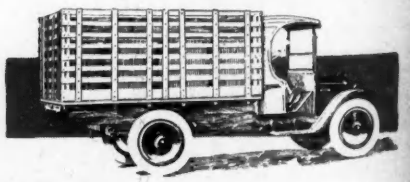
OLDS MOTOR WORKS : : Lansing, Michigan

Oldsmobile ECONOMY Truck

This One Chassis Etc.

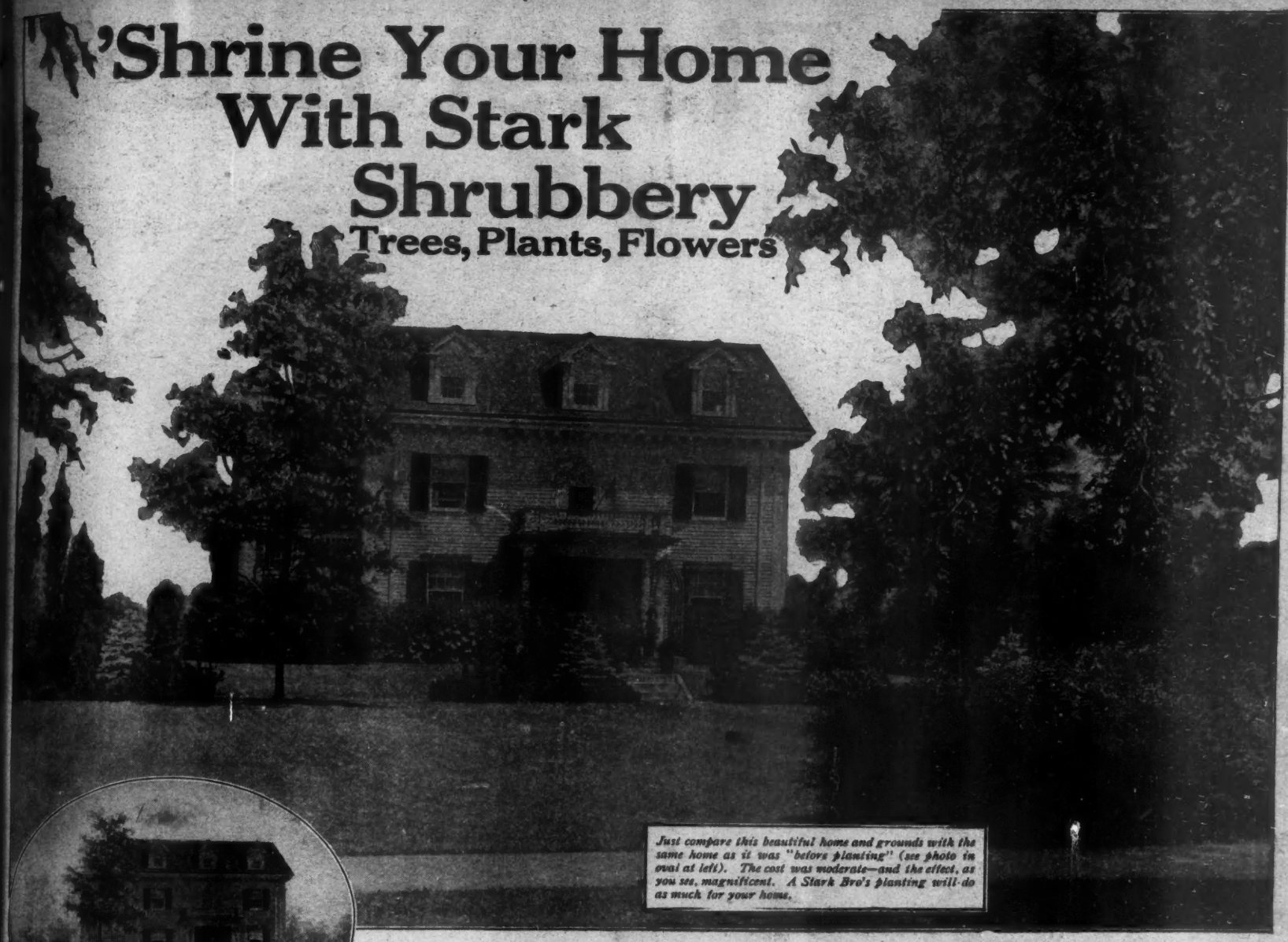






'Shrine Your Home With Stark Shrubbery

Trees, Plants, Flowers



Just compare this beautiful home and grounds with the same home as it was "before planting" (see photo in oval at left). The cost was moderate—and the effect, as you see, magnificent. A Stark Bro's planting will do as much for your home.

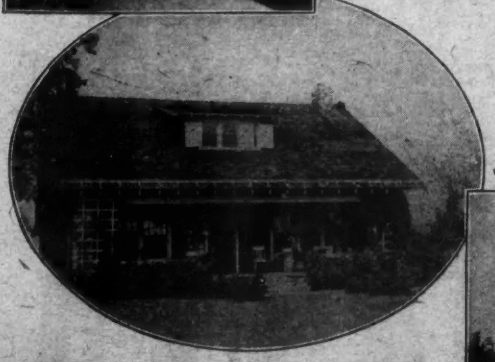
"Houses" become *homes* when set amid luxuriant shrubbery, stately trees, graceful hedges and beautiful plants and flowers. To assure the most satisfactory results, care should be taken in the selection of the varieties you plant—and in your plan of planting.

Home Grounds Beautiful—at little cost—are assured for you if you take advantage of the Home Beautifying Plan Service our Landscape and Ornamental Department gladly offers you. Shrubbery, trees, hedges, plants and flowers of topmost quality, lusty growth and great hardiness are assured for your home grounds if you secure your planting from our 104-year-old nurseries. Our Landscape and Ornamental Department is complete. It specializes on beautifying grounds of town, suburban and farm homes—but can and does take care of the largest country estate and municipal beautifying plans and planting. Graduate Landscape Architects, who have had years of actual experience, will design individual **PLANTING PLANS FOR YOUR GROUNDS FREE OF CHARGE.** Write us—send your name and address on the coupon below—or on a post card, to

Stark Bro's Ornamental Department

Photo above shows one home BEFORE a harmonious ornamental planting was made. Observe in large photo at top of this advertisement the remarkable improvement AFTER this home was given a beautiful ornamental setting.

Note the restful charm given this country home (photo at right) by a planting planned and set out by our Landscape and Ornamental Department.



Here at the right we see the results of an inexpensive planting of shrubbery. This is the farm home of J. Mac Tanner, a prosperous Illinois orchardist. He has been a planter of Stark Trees for many years and he knows the value of shrubs and blooming plants artistically placed around the home.

Look at this photo at the right and the one below it. See the wonderful change a Stark planting made—AT A COST OF MERELY $22.00.

The modest cost of a splendid planting of ornamentals will make "all the difference in the world" in the appearance of your home, in your enjoyment and pride in its possession, and will pay big dividends if you ever want to sell your home. Stark Bro's Landscape and Ornamental Department have helped thousands of home owners throughout the United States to make their home grounds a source of great pleasure—admired by every passer-by and envied by every neighbor.

Get Our New Book "Home Beautifying"

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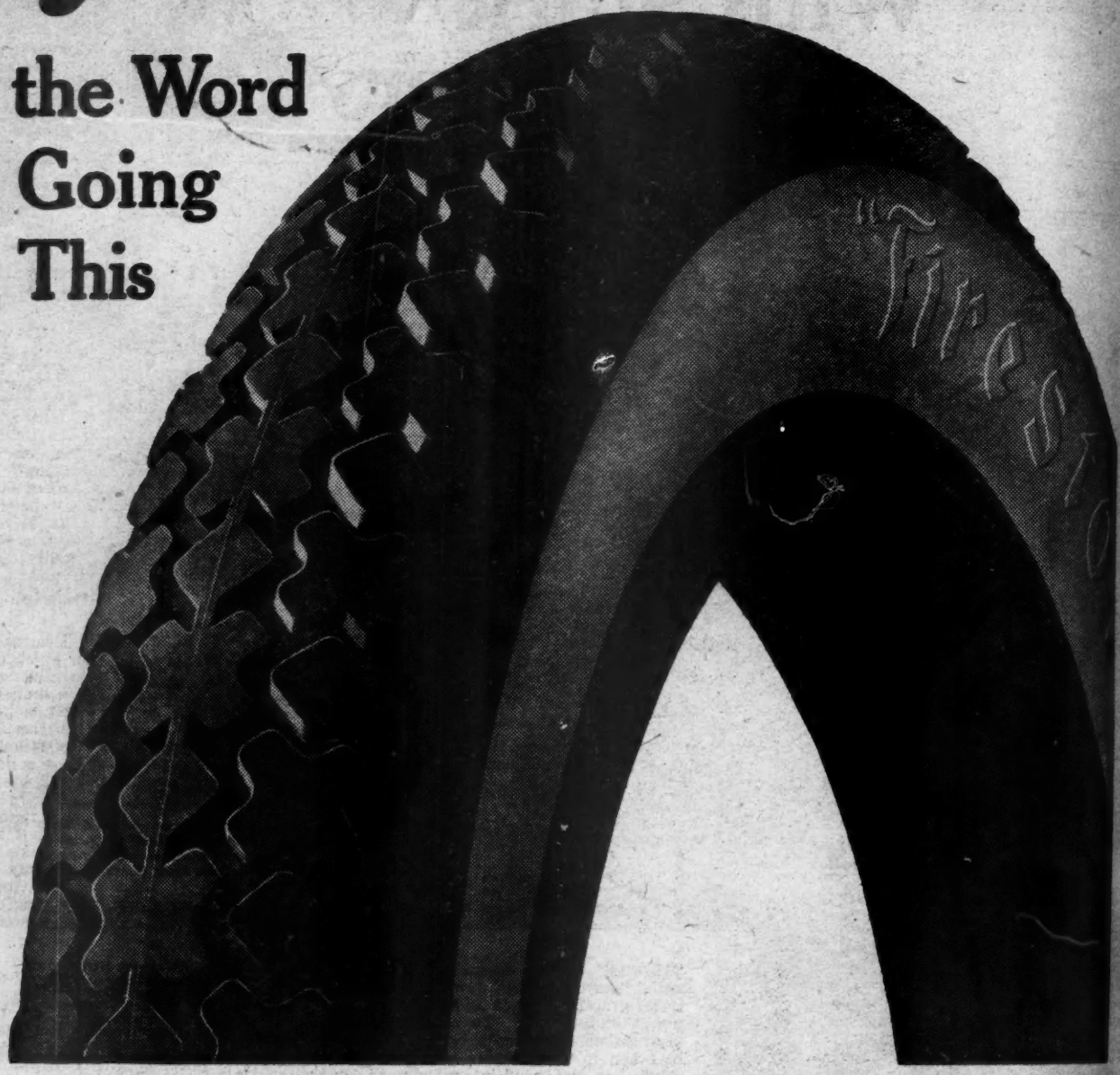

WHEREVER you go you hear car owners passing the word—"Buy Firestones. They're the best cords this year." The reasons are many, but the conclusion is the same—Buy Firestone Cords.

Read these spoken advertisements for the New Standard Oversize Firestone Cord with Extra Heavy Non-Skid Tread:

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"The extra air gives easier riding."

"The non-skid tread is fine; it holds in all kinds of roads and yet there's no power wasted."

"I bought it because of its extra size and the Firestone reputation."

"You'll notice that you go farther on a gallon of gas."

"It steers easy and grips the road."

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How to Prune Bearing Apple Trees

By Roy E. Marshall, Virginia

BEARING apple trees may be classified in two general classes from the standpoint of pruning. In the first class we have those trees that have been properly trained throughout the non-bearing and "coming into bearing" or transitory stages. Such a tree usually has its fruiting system fairly well established and requires little subsequent pruning. This pruning will usually consist in thinning out the new growth annually, sufficient to permit light and air to penetrate to all parts; heading any unruly or wayward branches back within bounds; preventing the formation of weak crotches; heading back branches tending to grow into others; and keeping the fruiting machinery—spurs—well distributed and functioning throughout the tree.

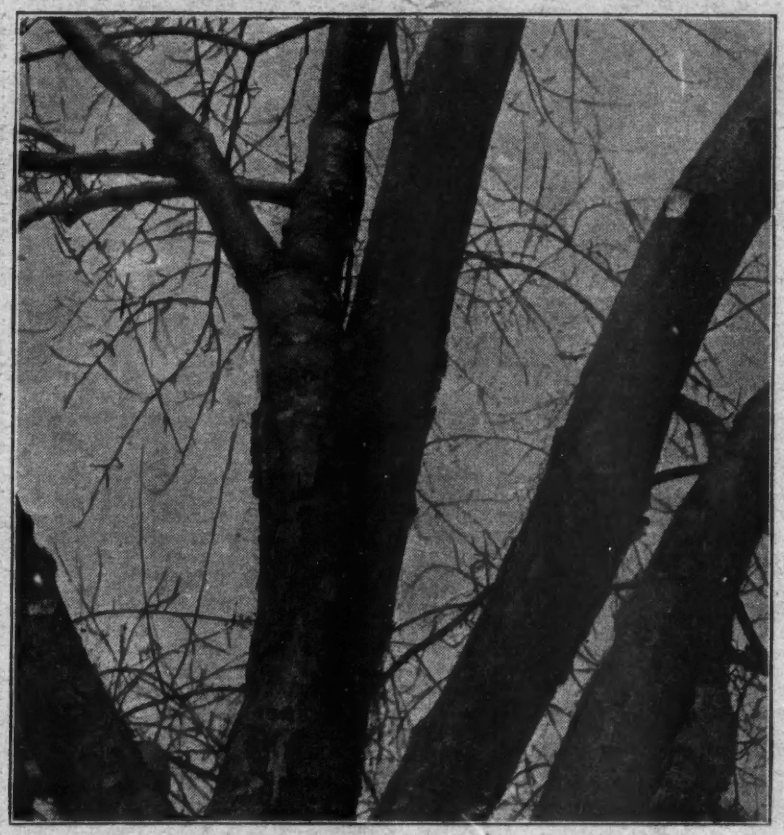
In the second class belong such bearing apple trees as have been more or less neglected as regards pruning. Some of them may not have been pruned for several years. This class of trees presents some very puzzling problems to many orchardists and it is the purpose of this article to give consideration to some of the problems usually encountered in pruning such trees.

Thinning Bearing Trees

The average more or less neglected bearing tree is so thick about the outer parts that an even distribution of functioning fruit spurs cannot be maintained. Thus the outer ends of the branches should be considerably thinned so as to permit a free circulation of air, ample light to produce fruit spurs and fruit, and to permit more thorough spraying. The common mistake is to pursue the easiest course and remove a few rather large branches, but such a practice leaves holes and does not result in an even thinning or an even growth. Again, too much large wood is removed, resulting in a heavy vegetative growth near the base of the removed branches.

In thinning out the outer parts of trees, less vegetative distrubance will result if many small branches—seldom over an inch in diameter—are removed in such a way as to leave the outer fruiting wood evenly distributed and still open enough to permit the entrance of light and air. This type of work is best performed when the pruner climbs out near the ends of the main branches where he is enabled to work with a saw and pair of hand shears. This practice requires time, but experience has proved that the extra time required is repaid many times through the better results obtained. In case old trees are bearing too many clustered, weak or inactive spurs, it is advisable to resort to a thinning out of these fruit spurs so as to admit light, prevent overbearing of small fruit, and to stimulate the remaining spurs.

Winesap Tree Before Pruning—Top too High and Dense for Good Fruiting



Main Branches of a 20-Year Old Apple Tree Bare of Fruiting Wood

Treatment of Rangy Branches

Bearing trees frequently contain many long willowy branches which sway about considerably thus bruising and knocking off the fruit. These branches should usually be headed back sufficiently to stiffen them and cause them to become more stocky. In heading them back, the cut should be made close to a lateral branch or spur, to prevent the end of the branch from dying back and to determine the direction of growth.

Lowering Tops of Trees

Fruit growers fully appreciate the inconvenience caused when the tops become too high. Many are bringing them down so that they may be successfully, as well as more economically handled. However, there has been a certain tendency to determine the height to which the trees should be reduced and then remove large branches to accomplish this. The result is that some parts of the tree which have been partially shaded are unduly exposed to the sun and scald results. In some orchards the bark on the larger branches has been killed fully one-third the way around the branch. Again, water sprouts usually develop in profusion following such heavy cutting back.

It is possible to reduce the height of these tops without taking such drastic measures. It is usually possible to cut some of the upright branches back, some two to five years in growth, to a side branch. Again, the remaining side branches may be shortened somewhat. Such measures will usually bring the tops of the trees some five to ten feet nearer the ground and are not especially detrimental to the tree as a whole. growth, in which case, the resulting However, this cutting oftentimes induces growth that should be removed in later. In the case of an old tree which has produced little growth in the top, but in which the top is too high, two or three years should be taken to properly lower it.

Treatment of Drooping Branches

Often old Winesap trees present a rather puzzling problem. In earlier years the branches were allowed to become too long and rangy. These branches are now unable to support their own weight, much less a load of fruit, clear of the ground. If these branches are removed, the trees become umbrella shaped, that is, too high headed, but drooping about the outer ends. This problem may be met by cutting back the main portion of the branch to some side branch or lateral, which grows out from the upper side of the main branch. This has been referred to as "undercutting," and makes it unnecessary to remove so many large branches, which may have fruiting wood well located near the main body of the tree. It also shortens the branches, giving them more rigidity, and keeps the branches off the ground.

Distribution and Establishment of Fruiting Wood

Bearing orchards are frequently seen in which trees have been stripped of all fruiting wood except near the ends of the branches. In other words, all the fruit is borne out on the ends of the branches, instead of being distributed throughout the tree. In many trees there is no fruiting wood within a radius of 12 to 14 feet from the head of the tree. It is understood that a branch can support more apples if they are distributed over its entire length, than if they are all clustered about the ends, probably six to twelve feet from the main trunk.

A scaffold branch should have several good lateral branches well spaced along its entire length, each lateral supporting its share of fruiting wood. Such a tree can support a given load to better advantage and carry a much larger crop of fruit. When pruning the young tree always leave fruiting wood, if it is located where it will have a chance to develop. The tree will fruit earlier and heavier.

In a tree in which the scaffold limbs are bare, by the use of well situated water sprouts, fruiting wood may be developed in the course of three or four years, by cutting them back from four to twelve inches in length to encourage the development of side branches. These in turn should be headed back the following year. After this the heading back should be lessened to encourage the formation of fruit spurs. This has been done successfully in numerous instances. To make this operation successful it is essential that the trees be thinned about

(*Continued on page 40*)

Winesap Tree After Pruning—Next Year, Top Cut to the White Line

How We Get Our Maple Sugar

By C. O. Ormsbee, Vermont

THE evolution of the maple sugar industry forms one of the most interesting chapters in the history of sugar. Approximately two hundred years ago a few botanists had recorded the fact that the maple tree of New England yielded a sap from which a sugar but little inferior to the poorer grade of cane sugar might be made. Fifty years later a few of the early settlers were making small quantities of maple sugar and using it chiefly as a flavoring for their home-made potato whiskey, and the clergy of that period were preaching against its use, much as they now preach against the use of opium, and even declaring the use of sugar to be a greater evil than the use of whiskey, itself.

One hundred years ago maple sugar had become a merchantable commodity, large quantities being sent from the rural communities to Boston, where it was used as an adulterant for the higher-priced muscovado sugar of the West Indies, and, in this form, much of it was returned to be consumed upon the farms where it originated. Fifty years ago its use as an adulterant had practically ceased and it had come into almost universal use throughout the region of its production as a substitute for the lower grades West India sugar. Twenty-five years ago the cane sugar industry had reached such a development that it was practicable to deliver the best grades of granulated sugar in all New England towns, at a price considerably less than the cost of manufacturing the crudest form of the maple product, and the maple sugar industry was in the most imminent danger of extinction.

Then it was that that the Vermont Maple Sugar Makers' Association entered the field and began a strenuous crusade in favor of an increased production and better methods of manufacturing and marketing. And the result of this crusade is that, today, maple sugar is universally regarded as one of the choicest of confections and table delicacies, and finds a ready sale at the farm, at prices ranging from 25 to 40 and even 50 cents a pound, with a demand far in excess of the supply.

From the Sap of the Tree

Maple sugar is a product of the evaporation of the sap of the maple tree. All species of maple yield this sugar-bearing sap, but the so-called rock maple so far excels all others in this respect, and is so much more closely associated in the forests, that fully ninety-five per cent of the commercial output originates in this species.

The rock maple is widely distributed throughout all the states east of the Mississippi river, and, to some extent beyond that river; and is the predominating tree in practically all that region that is drained by the St. Lawrence river and its tributaries.

The total amount of maple sugar, annually produced in the United States, is, including the sugar equivalent of that which is marketed in the form of maple syrup, runs closely around 50,000,000 pounds. Of this amount, approximately one-fifth is produced in Vermont, another fifth in New York, two-fifths in the three states of Michigan, Ohio and Pennsylvania, while the remaining fifth is distributed among the fourteen other states in which maple sugar is made.

The total number of trees utilized is something in excess of 18,000,000, and, from accurate counts in some of the states, and conservative estimates in others, it is known that the output might easily be doubled. This estimate does not include the millions of maple trees that are used for shade and ornamental purposes in parks, upon lawns and along the streets and roadsides, and which, if properly handled, are capable of yielding many thousand pounds of maple sugar, in the aggregate.

Sugar Content of the Sap

The sugar content of the sap varies principally according to the leaf area of the tree and the amount of moisture that was available during the previous season. The individuality is also an important factor, and there are several other minor and less understood agencies. But it ranges from a minimum of scarcely a trace, to a recorded maximum of ten per cent, with an average, as shown by innumerable tests, of closely around three per cent. And the amount of sugar-bearing sap that a tree will accummulate, is proportional to the size and length of its trunk, and the amount of moisture available during the previous summer.

But the amount of sap that a tree will yield, is dependent not only upon its size, but upon the atmospheric conditions during the so-called sugar season. For a maple tree is notional, and will yield its sap freely, only when the days

A Sugar Boiling House in Operation in a Vermont Sugar-Bush

are bright and clear, with a minimum temperature of sixty degrees, followed by equally clear nights, during which the mercury drops to several degrees below the freezing point. More than this, there must be a storm of either rain or snow as often as once a week, or oftener.

These peculiarities are unexplainable, but, because of them, and because such weather conditions prevail for any great length of time, only during the period of transition from winter to summer, the maple sugar season is, pre-eminently, during the months of March and April.

Statistics show that the averge yield of maple sugar per tree, is, at the present time, a trifle under three pounds per tree. Formerly, when the giants of the forest were still standing and available, the yield averaged much more, for, naturally, the size of the tree is a factor of great importance. Another factor greatly influencing the yield, is the fertility of the soil, and yields as high as thirty pounds per tree have been authentically reported. An approximate rule for estimating the yield, taking one year with another, is to allow three pounds of sugar for every cord of wood contained in the body of the tree. This rule is subject to many variations, but, taken as a whole, it is considered fairly accurate.

How Sap is Secured

The sap is obtained by wounding the tree. This operation is termed "tapping" and is performed in the early part of the sugar season. Formerly it was believed that the sap flowed in longitudinal channels, or pores, and that, the more of these that were severed, the greater would be the yield. Consequently a wound as made, often with an axe, as large and as deep as was deemed consistent with the future welfare of the tree.

It is now known that the sugar is manufactured by the leaves, during the latter part of the previous season, and stored in the tree for use in early spring. Also, that, during the process of digestion, which fits this sap for the use of the tree in making its growth, certain gases are generated, and the expansion of these gases forces the sap from the wound.

It has also been found that as much sap will be forced from a wound half an inch in diameter, as from one many times larger, while the injury to the tree will be of no consequence, it will heal in perfect shape in three years. Hence, in late years, maple trees are tapped with a sharp bit, not exceeding half an inch in diameter, and a clean hole about two inches in depth is made.

More sap will flow from two or more wounds, if in different parts of the tree, but in a rapidly decreasing ratio, and it is a disputed question among sugar makers, whether or not it is profitable to make more than one wound. Where double tapping is practised, the largest trees are selected, and the wounds are made fully two feet apart. It is essential that the wounds be made in a clean, healthy part of the trunk, and the gathering is greatly facilitated, if the wound is made at a convenient height, and upon the side of the tree most convenient of access. Points of the compass have no influence upon the yield.

The next step is the collection of the sap into suitable receptacles. The early settlers inserted a thin wooden spout into a transverse slit cut in the bark just below the tap-hole, and encouraged the sap to follow this spout into a clumsy trough, hollowed from a solid log, and set upon the ground. The trough gradually gave way to wooden buckets, and these have been practically superseded by those of tin or galvanized iron, while metal spouts, of a size to fit the tap-hole have displaced the original style.

The present method is to drive such a spout tightly into the tap-hole, and suspend the bucket therefrom, by means of a hook made for the purpose, and attached to the spout, thus allowing the sap to drop into the receptacle. But, in home manufacture, and when sugar is made in small quantities, any intermediate method, adapted to existing conditions may be adopted.

The sap is gathered daily, pured into a tank which is placed upon a low sled and drawn by horses or oxen to the boiling house. Under the most favorable conditions, a man and team can gather the sap from one thousand trees. Under adverse conditions, two men may be required to collect that flowing from five hundred trees.

Concentrating the Sap

At the boiling-house, the sap is drawn off, flowing by gravity, into a storage tank, and passing through a cloth strainer on its way. From the storage tank it flows, also by gravity, into the evaporator as needed, the amount being regulated by an automatic feeder, which, by means of a float and lever, checks the flow when the sap in the evaporator has reached a certain depth, and allows more to enter when evaporation has lowered the depth.

Formerly the sap was concentrated in huge, cast iron kettles. But these gave way to pans on sheet iron, set upon arches of brick or stone. And these have been practically superseded by the modern evaporator, set upon an especially constructed iron arch.

Various styles are in use, but essentially an evaporator is a large pan made of tin or galvanized iron, and with corrugated bottoms which expose more surface to the fire, and thus economize fuel. They are made in various sizes according to the number of trees in the orchard.

Ordinarily ten square feet of surface are allowed for each one hundred trees, but an evaporator having a surface of more than eighty square feet is not to be recommended. If the orchard comprises more than eight hundred trees better results will follow if two evaporators are installed. With good wood, of proper length, finely split and with good management, one cord will be sufficient to reduce the sap from two hundred trees to syrup. If opposite conditions prevail one cord to fifty trees may be insufficient.

The corrugations divide the evaporator into a number of compartments, and influenced by the unequal evaporation in the different compartments, the sap flows in a tortuous course, from one into another, traversing the entire length, and, in some types, returning on the opposite side.

As the sap enters the evaporator, it boils at a temperature of 212 degrees, but, as its density increases, owing to the removal, by evaporation of the surplus moisture, its boiling point increases proportionately, and it is retained in the last compartment until its boiling point reaches 219 degrees. It is then drawn off and separated from the small amount of mineral matter contained. This is done either by filtration or by sedimentation. The syrup is then poured into a deeper pan, with but a single compartment, returned to the fire, and re-boiled until a temperature corresponding to the product desired is reached.

In case maple syrup is desired, the product is standardized at a uniform temperature of 219 degrees, making an allowance of one degree for every five hundred feet of altitude. At this temperature, the product will consist of about five per cent of sugar, and will conform to the standard adopted by the Pure Food law, and, if properly sealed in either tin or glass containers, it will keep indefinitely.

Thirty-three per cent of the product of Vermont, ninety-seven per cent

Tapping Sugar Trees in the Modern Way

that of Ohio, and seventy per cent of the entire output of the United States is marketed in this form. When put up for the consumer, either the gallon or the half-gallon package is commonly employed, though glass bottles, holding quarts, pints, and half-pints, respectively, are rapidly coming into favor.

If intended for storage and subsequent working into some other form, it is drawn off into barrels. Formerly wooden casks were employed, exclusively for this purpose, but these are now being displaced by steel casks.

If the syrup is put up at a less density than that described, there will be a deterioration in flavor, if not an actual spoiling under long continued storage. If the density is increased, transparent, glassy crystals will be deposited on the bottom and sides of the containers. These form the rock candy of the confectioner, and often form the basis of the supposition on the part of the consumer that the syrup has received an admixture of granulated sugar. The syrup remaining forms the true maple honey, though maple syrup in its original form is often sold under this name.

Maple Cream is Delicious

If maple cream is the product desired, the syrup is boiled to a temperature of 230 degrees, poured into shallow pans, set upon ice, and cooled as rapidly as possible, to a temperature of 90 degrees. The pans are then clamped to a bench and the contents stirred rapidly and vigorously, until a product of a light cream color, of the consistency of ice cream results.

This is one of the most delicious of all confections, and is usually packed in jelly glasses, and thus finds a ready market at the rate of sixty or more cents a pound. Recently certain restauranteurs have adopted the practice of serving it upon plates, similarly as ice cream is served.

Reducing to Maple Sugar

Maple sugar is finished by boiling the syrup to a temperature to 235, or more, according as a soft or hard product is desired. When the desired density is reached, the sugar is removed from the fire, stirred more or less, accordingly as a coarse or a fine grain is desired, and packed while warm and soft.

Tin pails of five or ten pounds capacity form the favorite package for the consumer, though, if intended for long storage, wooden pails, holding twenty-five pounds each are preferable.

Manipulation not only influences the grain, but, to some extent, the color and flavor as well. If a dry, powdered product is desired, the syrup is boiled as for pail sugar, removed from the fire, cooled slowly and stirred constantly until dry and mealy. More commonly the pan is set upon the floor, and the contents attacked with a hoe, similarly as a mason mixes mortar.

This is a favorite form for serving upon cereals, and it commands from three to five cents a pound more than similar grades when packed in pails.

From the Gathering Tank, the Sap Flows by Gravity to the Storage Tank at the Boiling House

Cakes are made by stirring until the desired grain is reached, then packing while warm and soft, in molds of various forms and sizes, and removing when cold and hard.

Maple sap, as it comes from the tree, is as colorless as the purest water. But it is as susceptible as milk to bacterial influence. And bacterial products, not only produce a darker color, but they substitute a coarse, somewhat "tangy," and often a disagreeable flavor for the naturally delicate flavor of maple sugar.

More than this, they work a chemical change, whereby more or less of the product becomes incapable of crystalization. This portion is known as maple molasses, and is separated by drainage and while it has some value in domestic cookery and in the manufacture of certain candies, it is not in favor as a marketable product, and the efforts of the manufacturers are directed chiefly along the lines of preventing the development of the sap-souring bacteria.

To this end the utmost celerity in concentration, and the most absolute cleanliness in every particular is practiced. The evaporator is emptied and washed every night. The storage tanks are scalded as often as empty. The buckets are gathered several times during the season, brought to the boiling-house, scalded with boiling water, dried, and returned to the trees. And every utensil coming in contact with the sap or syrup is washed and scalded repeatedly.

Another factor which influences the color, and, to some extent, the flavor, also, is the caramelization of minute particles of sugar in the evaporator. This difficulty is met, and evaporation is hastened, by keeping the boiling sap as shallow in the evaporator as is consistent with safety.

If the sugar maker is successful, both in preventing the development of bacteria, and the formation of caramel, the product, dependent upon manipulation, will be of a very light color, with a peculiarly pleasing aroma, and a most exquisitely delicate and delicious flavor. If unsuccessful, the product will be proportionately dark in color, with an unpleasant odor, and a coarse and often a disagreeable flavor, which the consumer will enjoy only because some one has told him that it is delicious.

The Spray Gun a Great Labor Saver

By N. D. Peacock, Indiana

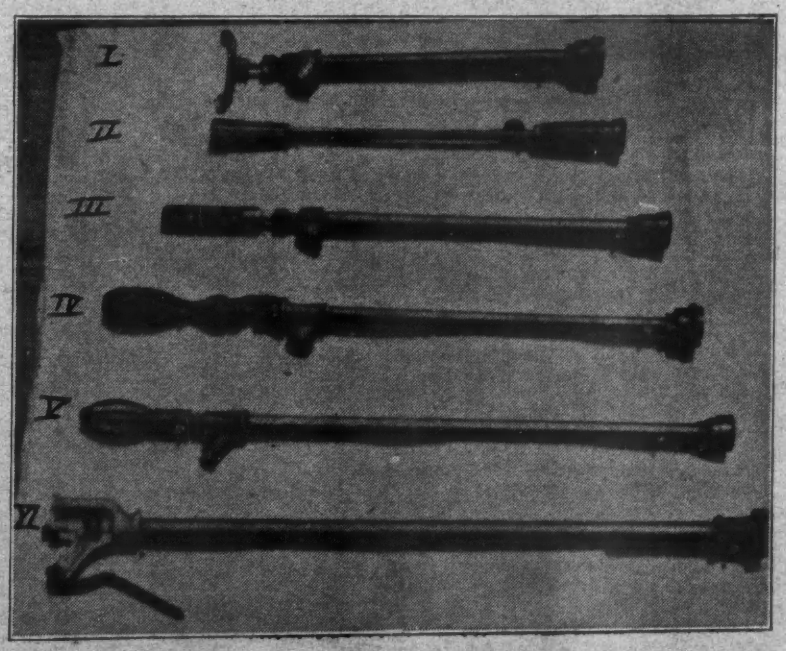
DURING the last few years the development of spray equipment has been phenomenal. Through all this development the general tendency has been towards higher pressure and a means by which the spray could be better controlled. The slow back-breaking work with the spray rod and nozzle together with the urgent need for a more rapid means of applying the spray led to the introduction of the spray gun back in 1916. Since that time many different kinds have been designed, all with some modification of the same principle. The purpose of the spray gun is to apply a large amount of material, under high pressure, in a comparatively short time and still control the spray in such a way as to reach the desired distance with a good mist and as little waste as possible. In order to accomplish this purpose certain points in construction are fundamental.

In the first place the nozzle must produce a very fine, wide mist spray or a coarse, dense, compact spray which will carry a long distance before breaking up and must be able to form almost any variation between these extremes if the best results are to be obtained.

Very closely connected to this and equally important in securing good results is the means of control. This must be rapid in order to prevent waste while changing from one type of spray to another and while passing from one tree to another. The shut-off must prevent any leaking but it must be easy to operate and not excessively tiresome. The entire gun must be of substantial durable construction and able to withstand a large amount of hard use. These are the important points to be desired in a gun and although they may not all be found in a single make at present, gradual development is bringing them nearer and nearer to the proper standard.

During the past spring I tested six different makes of spray guns both as to capacity, distance they would throw the spray vertically and horizontally with the different types of spray and also their performance in the field. These guns varied a large amount in types and details of construction and therefore clearly illustrate some important principles.

In the first place I found that none of the guns gave a satisfactory spray with 150 pounds pressure, 200 pounds were necessary for good results and 250 or even 300 pounds pressure was much better. The capacity increased fairly uniformly with the pressure in all cases. At 250 pounds pressure the capacity varied from 5 to 5¼ gallons per minute with the coarse spray adjustment and from 3 to 4¼ gallons per minute with the wide fine spray adjustment according to the make of gun.



Spray Guns of Several Makes: 1, Friend; 2, Deming; 3, Hayes; 4, Myers; 5, Bean; 6, Ward

The guns that showed the greatest difference in capacity, between the coarse and fine spray adjustment, also showed the greatest difference in the distance they would throw the spray horizontally at the two adjustments. These tests gave very good indications as to the efficiency of the control of the various guns but they did not at all indicate the ease or convenience of the control.

Much of the waste which occurs with the use of a gun is the material lost while opening and closing the gun. If the control is inconvenient or hard to operate a careless person will not shut the gun at all while passing from one tree to another, and in this way will lose considerable material. I found that the entire control from the shut off to the coarse spray position should not require more than one-half or two-thirds of a turn with the handle. Many of the guns require only about one-third of a turn and that was a decided advantage over those which required an entire turn or more. The control should operate easily and be as little tiresome as possible. If the control is secured by a lever instead of by turning the handle the lever should not be wide enough to stretch the hand and it should be so arranged that it will not be a continual strain to hold the lever against the force of the material while spraying.

Fine Mist Necessary

For satisfactory results with a gun you must be able to direct a fine mist spray to all parts of the tree as you can with a rod and nozzle. With some makes of guns I found that you could make a very fine mist close to you or a very coarse stream which would carry 35 or 38 feet, but you could not make a good mist at a medium distance. This is a very important disadvantage because in ordinary spraying the greater part of the tree will be only a medium distance from you and that is where you want your fine mist spray. Although the gun control is important in securing the desired fine mist the amount of pressure is even more important. The higher the pressure the more the material will be broken up and the more it will be spread. Both these conditions are necessary for rapid efficient work.

The guns I tested varied from 18 to 30 inches in length. I found the greater length to be a decided advantage. With the very short guns it was impossible to use them without having the spray blown back into your face. Even on very still days it was much more pleasant to have that large amount of material a little farther from you so that every flurry of air would not cover you with spray.

The spray gun is rapidly gaining in popularity among commercial growers and there is but little doubt but that it has come to stay. It is much more rapid than the old rod and nozzle and it is a great labor saver. There is still considerable difference of opinion as to the efficiency of this means of applying liquid for insect and disease control. It is however safe to say that it requires as great skill and more care to do thorough work with a gun than with a rod. With such a large amount of material passing through the gun there is apt to be quite a tendency to hurry along too fast without covering the tree entirely.

A green or careless hand would do better and more thorough work with a rod than with a gun. All of the material is applied from outside the tree and low down with the gun, while it is possible to work the nozzle of the pole entirely

(*Continued on page 30*)

How We Get Our Maple Sugar

By C. O. Ormsbee, Vermont

THE evolution of the maple sugar industry forms one of the most interesting chapters in the history of sugar. Approximately two hundred years ago a few botanists had recorded the fact that the maple tree of New England yielded a sap from which a sugar but little inferior to the poorer grade of cane sugar might be made. Fifty years later a few of the early settlers were making small quantities of maple sugar and using it chiefly as a flavoring for their home-made potato whiskey, and the clergy of that period were preaching against its use, much as they now preach against the use of opium, and even declaring the use of sugar to be a greater evil than the use of whiskey, itself.

One hundred years ago maple sugar had become a merchantable commodity, large quantities being sent from the rural communities to Boston, where it was used as an adulterant for the higher-priced muscovado sugar of the West Indies, and, in this form, much of it was returned to be consumed upon the farms where it originated. Fifty years ago its use as an adulterant had practically ceased and it had come into almost universal use throughout the region of its production as a substitute for the lower grades West India sugar. Twenty-five years ago the cane sugar industry had reached such a development that it was practicable to deliver the best grades of granulated sugar in all New England towns, at a price considerably less than the cost of manufacturing the crudest form of the maple product, and the maple sugar industry was in the most imminent danger of extinction.

Then it was that that the Vermont Maple Sugar Makers' Association entered the field and began a strenuous crusade in favor of an increased production and better methods of manufacturing and marketing. And the result of this crusade is that, today, maple sugar is universally regarded as one of the choicest of confections and table delicacies, and finds a ready sale at the farm, at prices ranging from 25 to 40 and even 50 cents a pound, with a demand far in excess of the supply.

From the Sap of the Tree

Maple sugar is a product of the evaporation of the sap of the maple tree. All species of maple yield this sugar-bearing sap, but the so-called rock maple so far excels all others in this respect, and is so much more closely associated in the forests, that fully ninety-five per cent of the commercial output originates in this species.

The rock maple is widely distributed throughout all the states east of the Mississippi river, and, to some extent beyond that river; and is the predominating tree in practically all that region that is drained by the St. Lawrence river and its tributaries.

The total amount of maple sugar, annually produced in the United States, is, including the sugar equivalent of that which is marketed in the form of maple syrup, runs closely around 50,000,000 pounds. Of this amount, approximately one-fifth is produced in Vermont, another fifth in New York, two-fifths in the three states of Michigan, Ohio and Pennsylvania, while the remaining fifth is distributed among the fourteen other states in which maple sugar is made.

The total number of trees utilized is something in excess of 18,000,000, and, from accurate counts in some of the states, and conservative estimates in others, it is known that the output might easily be doubled. This estimate does not include the millions of maple trees that are used for shade and ornamental purposes in parks, upon lawns and along the streets and roadsides, and which, if properly handled, are capable of yielding many thousand pounds of maple sugar, in the aggregate.

Sugar Content of the Sap

The sugar content of the sap varies principally according to the leaf area of the tree and the amount of moisture that was available during the previous season. The individuality is also an important factor, and there are several other minor and less understood agencies. But it ranges from a minimum of scarcely a trace, to a recorded maximum of ten per cent, with an average, as shown by innumerable tests, of closely around three per cent. And the amount of sugar-bearing sap that a tree will accummulate, is proportional to the size and length of its trunk, and the amount of moisture available during the previous summer.

But the amount of sap that a tree will yield, is dependent not only upon its size, but upon the atmospheric conditions during the so-called sugar season. For a maple tree is notional, and will yield its sap freely, only when the days

A Sugar Boiling House in Operation in a Vermont Sugar-Bush

are bright and clear, with a minimum temperature of sixty degrees, followed by equally clear nights, during which the mercury drops to several degrees below the freezing point. More than this, there must be a storm of either rain or snow as often as once a week, or oftener.

These peculiarities are unexplainable, but, because of them, and because such weather conditions prevail for any great length of time, only during the period of transition from winter to summer, the maple sugar season is, pre-eminently, during the months of March and April.

Statistics show that the averge yield of maple sugar per tree, is, at the present time, a trifle under three pounds per tree. Formerly, when the giants of the forest were still standing and available, the yield averaged much more, for, naturally, the size of the tree is a factor of great importance. Another factor greatly influencing the yield, is the fertility of the soil, and yields as high as thirty pounds per tree have been authentically reported. An approximate rule for estimating the yield, taking one year with another, is to allow three pounds of sugar for every cord of wood contained in the body of the tree. This rule is subject to many variations, but, taken as a whole, it is considered fairly accurate.

How Sap is Secured

The sap is obtained by wounding the tree. This operation is termed "tapping" and is performed in the early part of the sugar season. Formerly it was believed that the sap flowed in longitudinal channels, or pores, and that, the more of these that were severed, the greater would be the yield. Consequently a wound as made, often with an axe, as large and as deep as was deemed consistent with the future welfare of the tree.

It is now known that the sugar is manufactured by the leaves, during the latter part of the previous season, and stored in the tree for use in early spring. Also, that, during the process of digestion, which fits this sap for the use of the tree in making its growth, certain gases are generated, and the expansion of these gases forces the sap from the wound.

It has also been found that as much sap will be forced from a wound half an inch in diameter, as from one many times larger, while the injury to the tree will be of no consequence, it will heal in perfect shape in three years. Hence, in late years, maple trees are tapped with a sharp bit, not exceeding half an inch in diameter, and a clean hole about two inches in depth is made.

More sap will flow from two or more wounds, if in different parts of the tree, but in a rapidly decreasing ratio, and it is a disputed question among sugar makers, whether or not it is profitable to make more than one wound. Where double tapping is practised, the largest trees are selected, and the wounds are made fully two feet apart. It is essential that the wounds be made in a clean, healthy part of the trunk, and the gathering is greatly facilitated, if the wound is made at a convenient height, and upon the side of the tree most convenient of access. Points of the compass have no influence upon the yield.

The next step is the collection of the sap into suitable receptacles. The early settlers inserted a thin wooden spout into a transverse slit cut in the bark just below the tap-hole, and encouraged the sap to follow this spout into a clumsy trough, hollowed from a solid log, and set upon the ground. The trough gradually gave way to wooden buckets, and these have been practically superseded by those of tin or galvanized iron, while metal spouts, of a size to fit the tap-hole have displaced the original style.

The present method is to drive such a spout tightly into the tap-hole, and suspend the bucket therefrom, by means of a hook made for the purpose, and attached to the spout, thus allowing the sap to drop into the receptacle. But, in home manufacture, and when sugar is made in small quantities, any intermediate method, adapted to existing conditions may be adopted.

The sap is gathered daily, pured into a tank which is placed upon a low sled, and drawn by horses or oxen to the boiling house. Under the most favorable conditions, a man and team can gather the sap from one thousand trees. Under adverse conditions, two men may be required to collect that flowing from five hundred trees.

Tapping Sugar Trees in the Modern Way

Concentrating the Sap

At the boiling-house, the sap is drawn off, flowing by gravity, into a storage tank, and passing through a cloth strainer on its way. From the storage tank it flows, also by gravity, into the evaporator as needed, the amount being regulated by an automatic feeder, which, by means of a float and lever, checks the flow when the sap in the evaporator has reached a certain depth, and allows more to enter when evaporation has lowered the depth.

Formerly the sap was concentrated in huge, cast iron kettles. But these gave way to pans on sheet iron, set upon arches of brick or stone. And these have been practically superseded by the modern evaporator, set upon an especially constructed iron arch.

Various styles are in use, but essentially an evaporator is a large pan made of tin or galvanized iron, and with corrugated bottoms which expose more surface to the fire, and thus economize in fuel. They are made in various sizes, according to the number of trees in the orchard.

Ordinarily ten square feet of surface are allowed for each one hundred trees, but an evaporator having a surface of more than eighty square feet is not to be recommended. If the orchard comprises more than eight hundred trees better results will follow if two evaporators are installed. With good wood, of proper length, finely split and with good management, one cord will be sufficient to reduce the sap from two hundred trees to syrup. If opposite conditions prevail one cord to fifty trees may be insufficient.

The corrugations divide the evaporator into a number of compartments, and, influenced by the unequal evaporation in the different compartments, the sap flows in a tortuous course, from one into another, traversing the entire length, and, in some types, returning on the opposite side.

As the sap enters the evaporator, it boils at a temperature of 212 degrees, but, as its density increases, owing to the removal, by evaporation of the surplus moisture, its boiling point increases proportionately, and it is retained in the last compartment until its boiling point reaches 219 degrees. It is then drawn off and separated from the small amount of mineral matter contained. This is done either by filtration or by sedimentation. The syrup is then poured into a deeper pan, with but a single compartment, returned to the fire, and re-boiled until a temperature corresponding to the product desired is reached.

In case maple syrup is desired, the product is standardized at a uniform temperature of 219 degrees, making an allowance of one degree for every five hundred feet of altitude. At this temperature, the product will consist of sixty-five per cent of sugar, and will conform to the standard adopted by the Pure Food law, and, if properly sealed in either tin or glass containers, it will keep indefinitely.

Thirty-three per cent of the product of Vermont, ninety-seven per cent of

that of Ohio, and seventy per cent of the entire output of the United States is marketed in this form. When put up for the consumer, either the gallon or the half-gallon package is commonly employed, though glass bottles, holding quarts, pints, and half-pints, respectively, are rapidly coming into favor.

If intended for storage and subsequent working into some other form, it is drawn off into barrels. Formerly wooden casks were employed, exclusively for this purpose, but these are now being displaced by steel casks.

If the syrup is put up at a less density than that described, there will be a deterioration in flavor, if not an actual spoiling under long continued storage. If the density is increased, transparent, glassy crystals will be deposited on the bottom and sides of the containers. These form the rock candy of the confectioner, and often form the basis of the supposition on the part of the consumer that the syrup has received an admixture of granulated sugar. The syrup remaining forms the true maple honey, though maple syrup in its original form is often sold under this name.

Maple Cream is Delicious

If maple cream is the product desired, the syrup is boiled to a temperature of 230 degrees, poured into shallow pans, set upon ice, and cooled as rapidly as possible, to a temperature of 90 degrees. The pans are then clamped to a bench and the contents stirred rapidly and vigorously, until a product of a light cream color, of the consistency of ice cream results.

This is one of the most delicious of all confections, and is usually packed in jelly glasses, and thus finds a ready market at the rate of sixty or more cents a pound. Recently certain restauranteurs have adopted the practice of serving it upon plates, similarly as ice cream is served.

Reducing to Maple Sugar

Maple sugar is finished by boiling the syrup to a temperature to 235, or more, according as a soft or hard product is desired. When the desired density is reached, the sugar is removed from the fire, stirred more or less, accordingly as a coarse or a fine grain is desired, and packed while warm and soft.

Tin pails of five or ten pounds capacity form the favorite package for the consumer, though, if intended for long storage, wooden pails, holding twenty-five pounds each are preferable.

Manipulation not only influences the grain, but, to some extent, the color and flavor as well. If a dry, powdered product is desired, the syrup is boiled as for pail sugar, removed from the fire, cooled slowly and stirred constantly until dry and mealy. More commonly the pan is set upon the floor, and the contents attacked with a hoe, similarly as a mason mixes mortar.

This is a favorite form for serving upon cereals, and it commands from three to five cents a pound more than similar grades when packed in pails.

From the Gathering Tank, the Sap Flows by Gravity to the Storage Tank at the Boiling House

Cakes are made by stirring until the desired grain is reached, then packing while warm and soft, in molds of various forms and sizes, and removing when cold and hard.

Maple sap, as it comes from the tree, is as colorless as the purest water. But it is as susceptible as milk to bacterial influence. And bacterial products, not only produce a darker color, but they substitute a coarse, somewhat "tangy," and often a disagreeable flavor for the naturally delicate flavor of maple sugar.

More than this, they work a chemical change, whereby more or less of the product becomes incapable of crystalization. This portion is known as maple molasses, and is separated by drainage and while it has some value in domestic cookery and in the manufacture of certain candies, it is not in favor as a marketable product, and the efforts of the manufacturers are directed chiefly along the lines of preventing the development of the sap-souring bacteria.

To this end the utmost celerity in concentration, and the most absolute cleanliness in every particular is practiced. The evaporator is emptied and washed every night. The storage tanks are scalded as often as empty. The buckets are gathered several times during the season, brought to the boiling-house, scalded with boiling water, dried, and returned to the trees. And every utensil coming in contact with the sap or syrup is washed and scalded repeatedly.

Another factor which influences the color, and, to some extent, the flavor, also, is the caramelization of minute particles of sugar in the evaporator. This difficulty is met, and evaporation is hastened, by keeping the boiling sap as shallow in the evaporator as is consistent with safety.

If the sugar maker is successful, both in preventing the development of bacteria, and the formation of caramel, the product, dependent upon manipulation, will be of a very light color, with a peculiarly pleasing aroma, and a most exquisitely delicate and delicious flavor. If unsuccessful, the product will be proportionately dark in color, with an unpleasant odor, and a coarse and often a disagreeable flavor, which the consumer will enjoy only because some one has told him that it is delicious.

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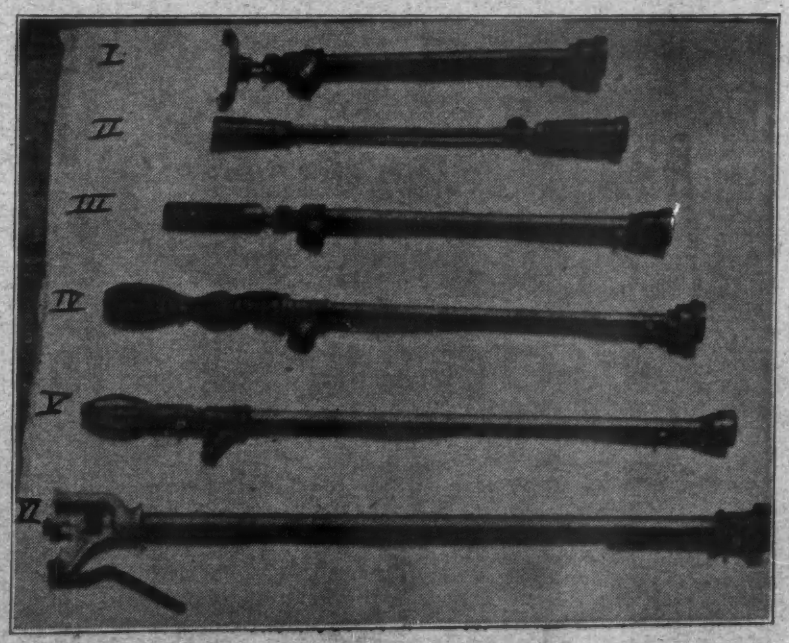

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(Continued on page 30)

Things That Make Trees Set Big Crops

By C. I. Lewis, Oregon

FOR thirteen years the Oregon Experiment Station has been investigating the pollination of fruits. We first determined the fertility or sterility of the varieties. Then the mutual affinity between our leading varieties of fruits, and in this way were able to determine what would seem to be the best pollinators for our leading commercial varieties of fruits. These investigations reveal the great necessity of pollinators for most varieties of fruit, especially such fruits as the Spitzenberg and Winesap apples and the Comice pear. Later these investigations determined that not only were the Royal Ann, Lambert and Bing cherries sterile, but they would not interpollinate each other. This investigation explained why so many of our commercial cherry orchards were failures. As a result most of the orchards planted to the varieties named have now had grafted into them a sufficient number of scions of good pollinators, so that we may expect heavy crops in the future.

Potatoes, Tomatoes and Beans are Profitable to Grow Between Young Trees

In our investigations we were interested in determining the cause of sterility, in order to find out whether the orchardist could in any way change or modify that condition through orchard practices. The early investigations did not throw much light on this subject, so we next took up a study of the structures which might be involved and this resulted in the bulletin known as the "Gross Morphology of the Apple."

Some Fertilizer Experiments

Contemporaneously with some of these investigations fertilizer investigations in Hood River and Rogue River were inaugurated. These were conducted on light soils with devitalized trees. These experiments have shown the great value of nitrate. This fertilizer gave marvelous results and almost immediately reinvigorated the trees causing satisfactory wood and leaf growth, greatly increasing the percentage of set and improving the grade and quality of the fruit.

Our result with nitrate fertilizers on apples led us to believe that nitrate was speedily playing a much greater role than the mere addition of so much nitrogen would to the tree and that the use of nitrate fertilizers on plants needed a much closer study than had heretofore been given. Finally, Dr. E. J. Kraus, of the Oregon Experiment Station, and Mr. H. R. Kraybill, of the Pennsylvania Station, started investigations at the University of Chicago where Dr. Kraus was on leave of absence for two years conducting research study. Their results have been published in Bulletin 149, entitled "Vegetation and Reproduction with Special Reference to the Tomato."

This is one of those rare publications which are really epoch-making because they reveal certain fundamental truths that enable us to interpret our general agricultural results. The title is misleading, as far as the average fruit grower or farmer of Oregon is concerned. While the investigational work dealt to a certain extent with tomatoes and is of distinct interest to scientists and to vegetable gardeners, it is, nevertheless, of greater value and interest to fruit growers and general farmers because it allows them to interpret their results and know why they may be obtaining good or poor crops.

It is very gratifying to the Horticultural Division because it shows that the general recommendations we have been making at this Experiment Station concerning the pruning, tillage, and use of fertilizers on fruit trees, have been sound. The bulletin is of especial interest because it gives the scientific reasons why such recommendations are sound. For example, we have been recommending that with orchards from six to ten years of age which are rather vigorous, that a system of light tillage or even no tillage at all, and in some cases even a crop of grain accompanied with light pruning, chiefly thinning, would aid particularly in encouraging fruitfulness on the part of the tree.

Strawberries Make a Good Inter-Crop for the Young Orchard

If we continued in the heavy cutting back, intensive tillage and stimulation which seemingly were very advisable during the first few years of the orchard's life we would not obtain fruit, but would simply obtain vegetative growth with very little fruit. The bulletin deals with the relation of nitrates and moisture to carbohydrates (substances like starch, sugar and the like) within the plant itself, and the responses apparently correlated therewith. Such relationships are four, and are as follows:

1. Though there be present an abundance of moisture and mineral nutrients, including nitrates, yet without an available carbohydrate supply vegetation is weakened and the plants are non-fruitful.

2. An abundance of moisture and mineral nutrients, especially nitrates, coupled with an available carbohydrate supply, makes for increased vegetation, barrenness, and sterility.

3. A relative decrease of nitrates in proportion to the carbohydrates makes for an accumulation of the latter; and also for fruitfulness, fertility, and lessened vegetation.

4. A further reduction of nitrates without inhibiting a possible increase of carbohydrates, makes for a suppression both of vegetation and fruitfulness.

This analysis is not intended, in any way, to convey the idea that only these compounds — carbohydrates, nitrates, and moisture — are concerned in vegetation and fruitfulness, but that the study in hand is principally concerned with them and the response resulting from an alternation of their relative proportions within the plant. It would be extremely difficult also to draw rigid lines between any particular class and the one next to it; since they intergrade insensibly one into another and yet, generally speaking, are recognizably distinct.

How the Plant is Fed

We have, coming up from the ground, the moisture and mineral nutrients, including the nitrates. On the other hand we have the leaves of the tree manufacturing from certain gases taken from the air and the materials which they secured from the roots, the carbohydrates, that is the sugar and starches. Practically every condition a plant or tree may be in can be interpreted according to the relationship of the moisture and nitrates on the one hand to the carbohydrates on the other hand. With certain relationships we may get no vigor in the tree and no fruit, yet other relationships produce both vigor of tree and fruit, while in others we secure plenty of vigor so to speak, but no fruit.

Let us see how these four statements pertain to the tomato plants.

Group 1, where we have an abundance of moisture and nitrates but a small amount of carbohydrates, may be illustrated by plants which are well fertilized, but strongly defoliated, heavily shaded, or severely cut back or pruned. The growth of such plants is tender, weak or spindling, and not productive of blossoms or fruit.

The second group, where we still have an abundance of moisture and much nitrate fertilizer, suggests a great deal of vegetative growth. Amount of carbohydrate or sugar and starch present in the leaves, is utilized almost entirely for wood or vegetative growth and we get no tomatoes, so to speak. Such plants generally have thick, large green leaves, and are characterized by being very vigorous, healthy or thrifty.

When the Orchard Reaches Maturity, It Must Have Plenty of Food and Moisture

With third group, we begin to reduce the amount of nitrate fertilizer placed on the tomatoes, which permits of an increase of sugar and strch proportionately and immediately the plants begin to become fruitful, blossom heavily and set well.

In the fourth group of plants we cease using much nitrate, using little or none, and the carbohydrates or sugars and starches accumulate in the plant and the proportion between them and nitrate is much in their favor. We find that while the plants may bloom under such conditions and have many blossoms, yet they fail to set and their vitality becomes weakened.

Pertaining to Apple Trees

Let us see how these four statements pertain to our apple trees for example. In the first group, where we have an abundance of moisture and mineral nutrients, but low available carbohydrate supply, (we can illustrate by several common cases, for instance, if we entirely dehorn a tree, leaving nothing but a stub) we have removed practically all of the sugar and starch from the tree, yet we have a great abundance of moisture and nutrients coming up from the ground. The tree cannot utilize, however, this material, because it has not enough stored food in the wood neither has it the foliage to utilize food. As a result the tree often dies or makes an extremely feeble growth. Another good example is where we practice excessive summer pruning, removing large quantities of wood and leaves or practice frequent pinching — such a practice dwarfs, may devitalize and reduce to too low an amount the carbohydrates and the foliage necessary to manufacture more.

In the second group, with an abundance of moisture and nitrates and with an available carbohydrate supply, we get greatly increased wood growth, but practically no fruit. This is best illustrated in a case of young trees, may be from one to five or six years of age, growing in rich moist soils and pruned rather heavily during the dormant seasons. Here we get a great deal of vegetative growth, all our orchard practices encourage it, but we get very little fruit.

The third group we can illustrate well by trees, say from nine to fifteen years of age, which are of very fair vigor and are producing heavy crops of fruit. Here we get a certain balance between nitrates and sugars and starches, neither one greatly predominates, both correlate nicely and produce both wood growth and fruit.

The fourth class we can illustrate by many of our older apple trees in the Pacific Northwest situated on light soils. The trees possess a large number of spurs, but make very little wood growth and appear greatly devitalized. Though they may be packed with sugar and starch, yet there is not enough nitrate to utilize it. Consequently, we do not get vegetative growth, neither do we get much fruit; the few blossoms set very poorly. It is with this class of trees that the application of a little nitrate works wonders, because the restoration of a small amount of nitrogen again restores a balance between the nitrogen on the one hand and the carbohydrates on the other, the tree begins to make vegetative growth and begins to set fruit again.

Let us just briefly apply these four principles to the life of an average tree. The first five years of the tree's growth

(Continued on page 14)

A Delicious Fruit from the Orient

By Ira J. Condit, California

Old p'simmon time is a-comin' round ag'in
And they ain't no man a'livin' any tickleder'n me
For the way I hanker after 'simmons is a sin—

THUS might we paraphrase Riley's "Wortermelon Time" and continue with several verses regarding the delectable qualities of the fruit commonly known as persimmon. Wild persimmons and cultivated persimmons will soon be tickling (or puckering as the case may be) the palates not only of Americans from Florida to California but of untold millions of people in oriental countries where the kaki or oriental persimmon is as common as is the apple in the United States. It is of this oriental persimmon that I wish to write.

The kaki or oriental persimmon was introduced into California about 1870 and is now to be found to a greater or less extent in nearly every county in the state. The tree is easily grown, is free from serious diseases and insect pests, and in most cases exceedingly prolific.

The fruit is very attractive in appearance, ships well to both local and distant markets, and is almost universally liked if eaten in the proper condition. Why then has the persimmon remained one of our minor fruits rather than taken its place among the leading fruits as it has in Japan?

Various reasons may be assigned for its lack of popularity, chief among which are the following: The general lack of knowledge among consumers as to the value of the fruit and its proper condition for eating, the failure of the growers and the marketing agencies to advertise the fruit and educate the public in regard to its proper use, the grower's lack of attention to the subject of varieties; pollination, natural and artificial ripening, the failure of growers to develop the industry in by-products such as dried persimmons. There is little doubt that persimmon culture can be made a much greater industry in California and the southern states if some of the points just mentioned are carefully studied and understood.

Interest Increasing

Interest in persimmon culture has materially increased, especially in California, during recent years on account of the high yields of orchard trees and the attractive prices of the fruit when sold. Commercial orchards, though small, are scattered throughout the state and others larger than any so far planted would have been set out this season had suitable nursery stock been available.

Up to the present time practically all the persimmon trees for planting in California have been imported from Japan. Considerable difficulty has been experienced not only with the failure of the trees to make a good stand when planted, but also with the varieties, which commonly proved to be different from those ordered.

One notable example of the latter difficulty is an orchard in the city of Los Angeles, the owner of which ordered one hundred trees of two standard varieties. When the trees came into bearing, he had about ninety trees of eight varieties, most of them bearing fruit that was small and inferior to the variety desired. California nurseries have not until very recently found it desirable to propagate the trees in quantity.

Since June 1, 1919, however, it has been necessary to depend entirely upon home-grown trees as Quarantine Order No. 37 of the Federal Horticultural Board forbids the further introduction from foreign countries of nursery stock capable of propagation.

A Valuable Bulletin

An excellent account of the propagation and culture of the native American persimmon is given in Farmers' Bulletin 685, United States Department of Agriculture, Washington, D. C., and some of the methods are applicable to the oriental persimmon.

The American persimmon rootstock has long been used in California, and has proved fairly satisfactory although it has the bad fault of suckering from the root when injured. A species of persimmon named lotus, native to China, is widely used in that country as a stock, and results already secured here seem to be very promising.

One propagator has secured excellent results with the lotus stock by using the following methods: the seeds of the lotus (often called Manchurian and sometimes Italian) are stratified in sand one inch deep, covered with oiled paper and kept in a cool place until spring, when they are planted out in nursery rows.

It is very important to shade the seedlings from sunburn as they are coming out of the ground. The sprouting is similar to that of beans, the cotyledons being pulled out of the ground by straightening of the arched hypocotyl, which is the tender part. The seedlings are thinned out or transplanted so as to stand six to eight inches apart in the row and each is shaded at the base, usually with a lath.

The Hachiya, a Popular Variety of Japanese Persimmon

A few of the largest seedlings may be budded in late summer or fall, but grafting in late or early spring gives best results. A shallow trench is dug along one side of the row and the larger seedlings cleft-grafted, the smaller whip-grafted The scions grow rapidly during the following season and the nursery trees are sold at one year of age.

The Hardiness of the Tree

Many of the first Oriental persimmon trees brought to the eastern United States were killed by the winter's cold, but the early horticultural reports show conflicting accounts regarding the hardiness of the tree. In general it can be said that the northern limit of successful persimmon culture is about the same as or somewhat beyond that of the fig tree. Unlike the fig, however, the persimmon fruit is not deleteriously affected by excessive atmospheric moisture and can therefore be grown over a wider range than the fig.

The trees are not particular as to soil conditions thriving in any ordinary good land. The trees are set about twenty feet apart and if properly grown, bear considerable fruit the third year.

Most growers in southern California depend upon the local markets to handle their fruit. The Hachiya has been returning to the grower five to seven cents a pound during recent years. The Tanenashi does not sell as long as the Hachiya is in the market and the former is often placed in cold storage. When the two varieties are on the Los Angeles market at the same time, the Hachiya brings two cents a pound more than the Tanenashi. Some Hachiya trees at Orange bear four hundred pounds of fruit annually. A grower at Monrovia harvested in 1918 from less than ninety trees about eight and one-fourth tons of fruit for which he received an average price of a little over six cents a pound. He believes the Hachiya on lotus stock should yield fifteen tons of fresh fruit per acre.

On the San Francisco Commission Market in November 1918 large Hachiya and Tanenashi persimmons were in good demand at $1.50 per box. Tsuru, Mikado, and Maru were in good demand at 75c to $1.00 per box. The boxes in one lot consisting mainly of Mikado and Hachiya ranged from 18 to 21 pounds per box in weight.

Color Is Attractive

Ripe persimmons are generally very attractive in color, the most fitting descriptive term being tomato-red. Their resemblance to tomatoes is often so noticeable as to cause newcomers to remark upon the wonderful tomatoes which grow on trees in California. The shade varies from a light yellowish-red in Tanenashi fruits to the very dark red of the Saburoza and the Yéddo Ichi, which color persists after ripening.

Some fruits, including the Hyakume from some sections, are unattractive on account of the brownish, mottled color which develops with softening. Many varieties are characterized by the presence of fine, pencilled lines encircling the apex or extending irregularly down the sides.

The flesh of most persimmons is juicy when sufficiently mature to be edible; the flesh of the Tanenashi, however, is peculiarly dry or pasty so that it can usually be recognized by this character alone.

The season for persimmons extends from October until January or even later. The fruits of many varieties, if not picked, will remain and shrivel up on the tree unless attacked by birds. Persimmons hanging on the tree after all leaves have dropped is a characteristic sight wherever the fruits are grown. The leaves themselves assume a beautiful color, a yellow or scarlet uncommon among other California fruit trees. A second crop of small fruits is common on the trees of certain varieties, notably the Maru and Hachiya, in Placer County.

A Mature Japanese Persimmon Tree in Full Fruiting

Cause of Pucker

A discussion of the persimmon would certainly not be complete without a reference to the pucker which characterizes the unripe fruit. The pucker or astringency is generally supposed to be due to the presence of soluble tannin in cells of the fruit. The effect of this tannin is not noticeable the instant a piece of the fruit reaches the tongue as it requires a short time for the tannin to diffuse in the saliva; its puckery effect is then pronounced, more so in some varieties than in others, and a second taste of such a persimmon is not usually attempted. As the fruit matures, however, the tannin becomes more and more insoluble until in a perfectly ripe specimen it is no longer perceptible. On account of this fact the astringent varieties should be perfectly soft before an attempt is made to eat them.

This conception of "soluble" and "insoluble" tannin, however, is inadequate according to recent investigations. The tannin-bearing cells of the persimmon are scattered in strands throughout the entire flesh excepting the gelatinous lining of the seed cavity. The tannin is associated with a mucilage-like carbohydrate which coagulates during the ripening process of the fruit and absorbs the tannin. In the fruits of some varieties the absorbed tannin becomes oxidized and red in color when the tannin masses can be readily recognized.

Some varieties of persimmons notably the Hyakume, Yeddo Ichi, and Maru have a light or orange-colored flesh when seedless but a dark or cinnamon-colored flesh when seedy. Other varieties such as Hachita, Tanenashi, and Tamopan are always light-fleshed whether seedy or not.

It can be stated in a general way that all dark or cinnamon-colored flesh of persimmons is puckerless; the light-colored flesh may or may not be astringent. Some of the best varieties grown in Japan and China such as the Fuyu, are always light-fleshed and puckerless. We believe that the success of persimmon culture in the future depends to a considerable extent upon the propagation and distribution of these superior varieties of the orient.

SPRAYING FRUIT WON'T POISON YOU

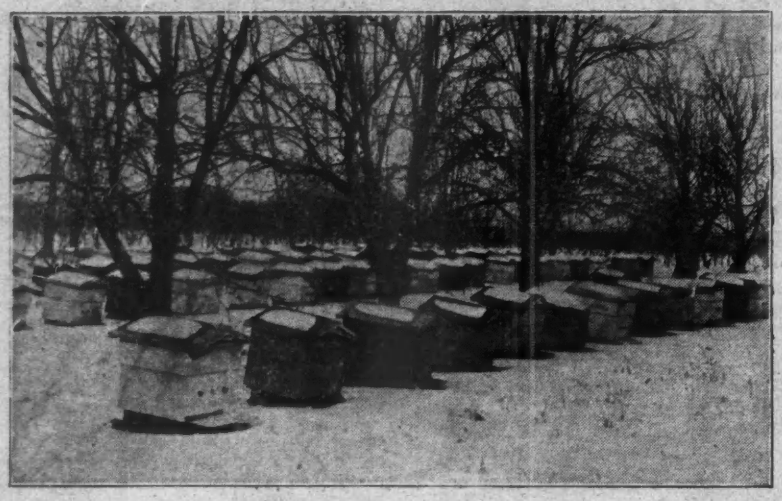
Boston recently started a campaign against sprayed fruit, on no better foundation than that a woman, who died suddenly, was found by the autopsy to have traces of arsenic poisoning. The woman had also eaten Bartlett pears from California. It has been demonstrated over and over again that it is physically impossible to eat enough sprayed fruit to be poisoned by it. If you could and would eat six boxes of such fruit at a sitting, you would probably die and the autopsy might show some trace of arsenical poisoning, but even so it would be the amount you had gorged rather than the quality of it, that finished you.

Combining Bees with Fruit

By Frank C. Pellett

IT IS an open question as to whether it pays best to devote ones entire time to a specialty, or to combine two or three lines. Individual circumstances will largely determine which is best. While a few get large returns from specializing, there is no doubt but what several lines provide safety against seasons of failure and provide something to sell at frequent intervals, rather than once a year.

Beekeeping and fruit growing make an ideal combination. In the first place the presence of the bees greatly facilitates pollination of the fruit blossoms. Then both fruit growing and beekeeping are subject to their ups and downs, their seasons of great abundance and seasons of scarcity. While either alone will provide a comfortable competence, both together will reduce the chances of a season with nothing to sell. The man with small capital will usually find it a safer proposition to start with several irons in the fire, even though some lines are somewhat neglected at times. The writer knows from experience that it is not a particularly pleasant feeling to be dependent upon a large orchard with no other source of income, and then to have a late freeze kill every apple in the orchard.



One of Mr. Baxter's Apiaries in Winter

Bees and Fruit Bring Profit

Neither beekeeping or fruit growing is likely to succeed very far without careful attention to details. The time pruning are done before the time when the bees require most attention and the harvest comes after the honeyflow is mostly over.

Extract Honey for Storage

A great advantage of honey production lies in the fact that the crop can be kept indefinitely without deterioration, if properly cared for. With fruit, the time is limited before it must be marketed. With berries it is very short, with grapes not much longer, and even with apples but a few months intervene between the time when the fruit is picked and when it begins to decay. All agricultural crops are subject to great fluctuations in price. Against low prices the fruit grower has no defense since his crop cannot be carried over to

Mr. E. J. Baxter, at Right, and His Crew of Pickers at Grape Harvest

is long gone by when a man can set an apple orchard and live from the fruit without further attention till harvest time. No more can he expect to get a profitable crop of honey by setting his hives in the shade and leaving the bees to shift for themselves till time to remove the honey.

As an example of the possibilities of the combination of beekeeping and fruit growing on a small acreage of land we may point to E. J. Baxter of Nauvoo, Illinois. There are ten acres of land in the Baxter home place, situated in the outskirts of the historic old town of Nauvoo. In addition he has another small tract at a short distance which he has at times cultivated himself. He is located within less than a mile from the Mississippi River so that the limestone soil and proximity to the water makes an ideal situation for fruit growing. He has grown strawberries, raspberries, grapes and apples, with small quantities of pears and other fruits. Of late years he has depended mostly upon apples, grapes and his bees. Orchard fruits and grapes combine nicely with beekeeping. The early spraying and another season in the hope of a better market. Extracted honey in tin cans or barrels, kept in a dry place, is as good after two or three years storage as ever. Comb honey cannot be kept so long because of the tendency to granulate. Honey granulated in the comb cannot be restored without melting the combs. Extracted honey will granulate as quickly but may be stored in the candied state until ready for use and can then be readily restored to the liquid state by applying a mild heat. Care must be used, of course, not to overheat it and thus spoil the flavor.

In 1916 the bottom dropped out of the honey market and good white honey sold in carlots as low as six cents per pound. A few men who held on to their crops were able to sell within two years for as high as 20 cents and even 25 cents in carlots for the same grade of extracted honey.

His Bees Averaged Large Profits

There is much lack of information in regard to the possibilities of beekeeping, properly conducted. The writer once heard a fruit grower who had long kept a few bees state that such crops as are often reported are impossible. Because he had secured small returns from his bees, for lack of intelligent attention, he assumed that others could do no better. The writer has visited hundreds of expert beekeepers in various sections from New England to California and from Canada to Florida and Texas. It is safe to say that in the average locality fifty pounds of honey per colony per year is not a high return. In favorable locations 100 pounds per colony on an average for a series of years may often be expected. This assumes expert attention. At present prices this gives a very favorable return on the investment of labor and capital. At the low prices prevailing for years before the late war, Mr. Baxter was able to get a net return of seven dollars and seventy-five cents per colony from his bees for an average of three years.

To quote returns at the present abnormally high prices is hardly the way to give a fair impression as such prices are not likely to continue for many years. Baxter's income from his bees and fruit for an average year before the great advance in prices was about $4000. With the same amount of produce to sell it would now be a much higher figure. While the same amount of capital invested in bees alone that is invested in the whole business, would show a larger return for a single year now and then, there would be years when there would be no honey to sell. However, seasons of failure of the fruit crop cannot be discounted, except by saving something from the proceeds of a good crop. A failure of the honey crop is often discounted by moving the bees to other pastures. The season of 1919 was a poor one for honey over much of the Middle West. At Hamilton, Illinois, the crop from clover was an entire failure and the beekeepers faced the possibility of feeding to carry the bees through the winter. The Dadants have at that place about 700 colonies of bees. Finding no crop in sight, they loaded them on their big trucks and moved them about thirty miles to lowlands along the Mississippi River where there had been an overflow in the spring As a result of the move they avoided having to feed the bees and harvested about twenty tons of honey, from Heartsease and Spanish needles.

POPULARIZING DRIED PEACHES

By Robert E. Jones, California

What can be done to broaden consumption and therefore the demand for fruit products, as well as for manufactured articles has been one of the big revalations that has attended organization of fruit growers into co-operative marketing associations. The California Peach Growers' Association, but three years old, already has demonstrated that the dried peach sold slowly and to a comparative few only because its good points were not widely known and because few housewives knew how to prepare it.

People these days like to know about the things they meet in every day life and the peach growers took advantage of this American characteristic. They have spread the story of the dried peach in pamphlets with packages, through magazine advertising and by using the motion picture. The complete story of the peach in "movie" form was prepared last year and it has traveled the circuit. The picture showed the planting of the orchard, the picking of fruit, drying the fruit and the housewife prepairing peaches in her kitchen.

Of course this propaganda work has been accompanied by every effort to improve the quality of the pack, curing methods, etc. The product has been standarized through organization and now, when the housewife buys, she knows by the growers' label that she is getting a good product.

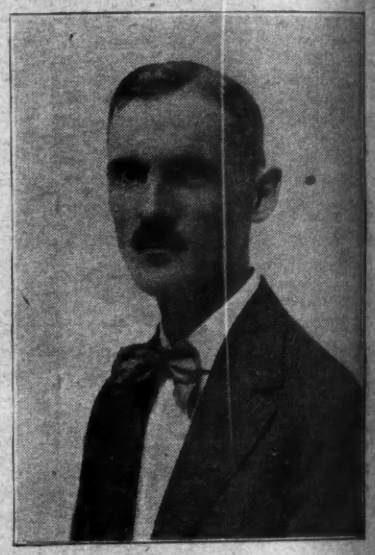
Here is a little hint in preparing dried peaches for cooking: First, wash them and then let soak in water overnight before they are cooked. The water should be luke warm when it is poured upon the peaches in the pan.

OUR NEW ASSOCIATE EDITOR

Many readers of the AMERICAN FRUIT GROWER were, at some time in the past, subscribers to The Fruit-Grower of St. Joseph, Mo., and will remember its editor, Mr. E. H. Favor. We are pleased to announce that Mr. Favor now is First Associate Editor of the AMERICAN FRUIT GROWER, and will be located here at our head office in Chicago.

For the past two years Mr. Favor has been serving as Horticulturist for the Hayes Pump & Planter Co., Galva, Ill., in which work he gained invaluable experience in the vital problems of selection and operation of efficient orchard equipment, particularly sprayers.

Mr. Favor is a graduate of the University of Missouri, which institution he served for several years as Assistant Horticulturist; later serving in a similar capacity at the Utah Agricultural



E. H. Favor, Associate Editor

College. He then became editor of The Fruit Grower of St. Joseph, Mo., a publication that now is a part of the AMERICAN FRUIT GROWER. As editor of The Fruit Grower, Mr. Favor was very active in every movement which had for its purpose the production of more and better fruit, and because of his extensive knowledge of horticultural problems in every portion of the United States the Hayes Pump & Planter Co., popularied the slogan "Ask Mr. Favor."

We feel that the AMERICAN FRUIT GROWER is to be congratulated upon having Mr. Favor upon its editorial staff, as his training in both horticulture and journalism will enable the AMERICAN FRUIT GROWER to be of utmost help to its readers. Mr. Favor will be very glad to hear from his multitude of friends among our readers or to have you come in and call on him when you are in Chicago.

INSURANCE FOR EMPLOYEES

In an effort to stabilize labor, the Yakima Valley Fruit Growers' Association adopted in 1918, a profit sharing plan. There was added money for those employees who stayed throughout the season.

This plan worked so well, according to C. H. Hinman, general manager of the company, that a group insurance covering all workers was unanimously voted this year by the directors. Quoting from the New York Packer, "A thousand dollar straight life policy is taken out, payable to whomever the worker names and, owing to the spreading of the risk over such a large number, none of the employees were required to do more than give their names, ages and a few such details."

Believing that success depends largely upon the co-operation of the workmen, the association is gratified by the responses that have come to them, and feel they are helping to solve the labor problem in helping the laborer.

With Our Editor

Liability of Insurance Company

A CASE touching liability of insurance companies, came up in the Michigan courts and is worth keeping in mind. A fruit grower, who had insured his crop in a mutual hail insurance company, claimed damages for the injury done his bearing fruit trees by a hailstorm which struck his orchard in May, when the trees were in blossom. The wording of the policy protected him against "damage done by hail to growing grain, fruit and other products" yet, though the agent examined the property and saw the severe injury, the company claimed exemption from liability on the ground that at the time of the hailstorm the fruit itself was not growing, and the amount of loss must therefore, be uncertain.

The company also suggested the possibility that the stricken blossoms might have failed to set fruit even without the storm. The judge, with plain common sense, refused to order a verdict on these grounds and the jury found for the farmer. The company's appeal to the Supreme Court of Michigan was answered by the judge of that court as follows: "These members ought to have agreed among themselves concerning the state to which nature must have brought growing grain and fruit before liability would attach for its destruction if they did not want the courts to give the words employed by them the popular meaning."

He referred to "the rule that the language used by the insurer in the policy will be given a favorable meaning to the insured. . . . . It being so easy and manifestly so proper for the defendant to state a rule, we shall attempt none for its guidance. We are content to say that evidence was introduced which fairly tends to prove that the trees in the plaintiff's orchard had on them growing fruit, fertilized growths, which in due course would have been apples and pears, for the destruction of which by hail, the defendant by the terms of its policy, may be liable." The decision of the lower court was thus confirmed and the company held responsible for the award of $1,156.50 damages.

Insurance companies may now act upon the hint of the judge and change the wording of their policies to be less favorable to the farmer than formerly. Policies should be very carefully read and clearly understood before they are accepted. We think well of insurance and constantly urge it upon our readers, but a word of warning against heedless acceptance may be seasonable.

Careful There! With the Spray

IT'S HUMAN nature to shift the responsibility for a misfortune to anybody or anything but ourselves, and often we honestly do not see where we were at fault. The careless maid still insists that the broken dish just jumped out of her hand, and the careless fruit grower is sure that the spray formula is responsible for the injury to his trees.

The AMERICAN FRUIT GROWER receives many complaints of the effect of certain sprays and, in a proportion of instances, it is apparent that the spray material was at fault, but more often it develops upon inquiry that the orchardist failed to follow the exact formula or to take the precautions advised. He put in a little more or less of this or that. He was not certain that the mixture was in perfect solution. He has sprayed on a wet day, or a windy one when only half of the tree could be covered. He has delayed the application until too late to accomplish results.

A well-known authority urges that "spraying should be done only at the right time, with the right material and no other, and as often as is necessary but no oftener." "With the right material but no other," contains a warning all must heed if they would avoid disappointment. There are some dangerous and untried sprays on the market and only the tried and reliable should ever be used in your commercial orchard. If you must experiment with a new spray (and we believe every fruit grower should be to a certain extent an experimentalist), confine the trial to a small plot and do not risk your entire output.

Forty Hours a Week Not Enough

HAVING given it as their sober judgment that 40 hours of work and 128 hours of idleness each week, would result in failure adequately to feed the country, the Farmers' National Congress, meeting at Hagerstown, Md., put itself on record as opposed to the present demands of radicalism. The man who tills the soil may be counted on for a certain sane conservatism as well as for that degree of public spirit which considers the good of the nation and molds conduct upon lines that tend toward the general welfare, rather than on mere personal considerations.

The introduction of better and ever better farm power-machinery, goes farther than anything we can think of toward making it possible for the farmer to shorten his long working day, and is a far safer way than trying to get along on less food. Experiments in cutting down the food supply, have never resulted happily for the health of those involved. Until the stomach of man has had time to adapt itself to famine conditions, there's not much chance to rest.

Do Yourself a Good Turn

FIFTY THOUSAND DOLLARS from a seventy acre orchard is a snug fortune for any man. An orchard producing such a vast sum of money in a single season invariably is in its prime and will continue for a period of years to produce abundant and profitable crops. It becomes more and more valuable with each succeeding year, increasing the owner's personal wealth, improving his standing with financial institutions, and giving him pleasures and satisfaction otherwise not obtainable.

Such orchards do not just happen into existence. They are built up through long periods of years by careful nursing and intelligent care. Their operators keep abreast of the times by mingling with their fellow growers, by reading the best magazines and books on fruit growing, and putting into practice the most up to date methods.

The mission of the AMERICAN FRUIT GROWER is to create more such fruit growers, by carrying to its readers each month the newest and best practices in fruit growing. That it is succeeding in this is voiced in the hundreds of letters from our readers who tell us frankly of the many helpful, money-making suggestions they gather from our columns. These letters evidence a real and abiding friendship for the AMERICAN FRUIT GROWER, and prove that our readers profit in dollars and cents by reading the helpful stories in our columns.

This month—January—many subscriptions expire. In each case the paper will stop unless a renewal is received. And as extensive plans have been made to make the AMERICAN FRUIT GROWER of more help to our readers during the coming season than at any time in the past, we want each reader whose address lable on this issue indicates early expiration to send in his renewal now.

In the last issue we asked our readers to do a friend a good turn by handing the subscription blank which accompanied that issue to a friend. The response has been enormous. We not only thank those who have responded, but assure them that such encouragement spurs us into greater effort to make the AMERICAN FRUIT GROWER of more help to you.

And we can do this best if we can have your co-operation. Just turn to page 23 and make use of the coupon. Send it with the proper remittance to us and thus make sure that your paper will come to you regularly during the coming years. Do yourself a good turn by renewing your subscription and make sure that you will have the benefit of the instruction and help that may be had from our columns.

The amount required is small. The results will be large for you. In no other way can you spend an equal amount that is certain to bring you larger value. Just turn now to page 23 fill out and clip the coupon and mail it today before you forget it.

The Woolly Aphis

By E. W. Mendenhall, Ohio

THE Woolly aphis (Schizoneura Lanigera, Hanseman) is one of the most destructive insect pests of the apple and pear, and is known some times as the apple blight, and in Europe it is called "American blight." It is thoroughly distributed over the United States and almost universally present where apples are grown—and might be considered a cosmopolitan insect. It is a matter of dispute whence it came, but as far as known, it is a native of Europe. English entomologists believe that the insect is of American origin calling it "American blight."

It is one of the best known pests of the nurseryman and fruit grower, and the chief insect attacking the roots of the apple tree. It is one of the insects that is liable to be planted with the tree the insects often being on the roots of the tree when it arrives from the nursery.

The plant lice of this species are readily recognized on trunks, limbs, smaller

Woolly Aphis Injury to Apple Tree Roots

twigs, particularly water sprouts, by the woolly secretion attached to their bodies. When abundant, it appears as bluish white cottony masses which may be found in clusters of minute, dark red or purplish lice. The lice are most usually abundant on roots, but appear above the ground on branches, trunk and young shoots, often collecting in an old scar and on large and small roots alike. They form gall-like growths of all sizes, and by this fact and smoothness of their gall, these growths can usually be distinguished from those of crown gall. It is especially injurious to young trees, and when badly attacked the tree becomes sickly and the foliage turns yellow, and if not killed outright by aphids, it falls an easy prey to borers and other pests.

Causes Great Loss

This species resembles the grape phylloxera in having a root-inhabiting form which causes knotty swellings on the fibrous roots. The grapevine phylloxera is said to have cost the French nation more than the indemnity paid to the Germans after the Franco-Prussian war. The damage caused by woolly apple aphis has been so vividly recognized, particularly on nursery stock and young trees, that several states have passed laws against its introduction into, or toleration within the state.

The woolly apple aphis, unlike the green and rosy apple aphis, prefers the twigs and branches to the foliage or fruit. It has caused more trouble in the nurseries in Ohio than all other pests combined. It is a hard one to combat for it works deep in the ground upon the fibrous roots of trees and the same difficulties are met in attempting to destroy the grape phyllorea.

The loss sustained by the nurserymen in this country by the woolly apple aphis has been enormous and has run up into the millions of dollars. From a "Nursery and Orchard Report for 1908," in one apple block of forty thousand trees it was estimated that seventy-five per cent of the trees were injured to such an extent as to render them unsalable. The same block was lifted in November and by actual count ninety per cent of the trees were discarded because of root injury caused by these insects. Apple stock cannot be grown with profit under such conditions. Nurserymen have never been able to do much to control woolly aphis, usually trusting that enough trees would escape injury to make them a fair profit.

Description of Woolly Aphis

But it has gotten so bad, especially where apples have been grown a long time, that growers have given up raising apple stock. On infested trees, aphids will be found in all stages of growth on the roots in early spring. In summer, especially during the months of July and August, the woolly apple aphis is exceedingly abundant upon the limbs of the trees, covering large patches with their extensive colonies. Early in the fall a generation of winged aphides appear which migrate to other trees. They are about one-twelfth of an inch long and have a wing expanse of one quarter inch. They appear to be black but the abdomen is really dark yellowish or rusty brown color when closely examined and bear more or less of the waxy secretion on the tip.

Each of these winged females give birth from four to six wingless males and females, which are deposited on the trunk of the tree. The sexes are wingless, much smaller than the summer forms and are without beaks, so that they take no food. The female is a brown ochre color and the males dark green or greenish brown. They become full grown in about eight days, when they mate and the female then lays a single large black egg which is deposited in the crevices of the bark on the lower part of the trunk. These eggs hatch in spring and give rise to new colonies.

The apple is the favorite food of this insect, it also feeds quite extensively upon the root of pear trees. There is considerable difference in the attacks upon the varieties of the apple. The Northern Spy is practically immune.

In Australia, it is particularly serious and has been successfully combated by the use of Northern Spy roots. These roots have proven equally effective in California. Vigorous growing varieties, such as the Rhode Island Greenings and Bellflower, are very much injured. The states and the government have carried on experiments, and several materials were used to kill the root form by removing the dirt around each tree to the depth of six or eight inches, but I believe the best results and the least injury to the tree was from the use of tobacco dust. I have not the data at hand giving results of these experiments as these were carried out. These treatments were made, however, during the spring and summer when the tree was in a vigorous growing condition. The nurserymen use tobacco stems, more or less, to destroy the aphids, especially in districts where tobacco is grown extensively. It is applied along the rows, which probably kills some aphids and acts as a repellant. It is also a great fertilizer for the soil.

After the woolly aphis has attacked the roots, it is not easy to kill because it is hard to reach with a spray, and if treatments are made, the soil must be removed from the tree sufficiently exposing the infested area. Spraying the roots with "Black leaf 40" is recommended, using 1 pint plus 3 to 4 pounds of soap to 100 gallons of water (a dilution 1 to 800) with high pressure from 200 to 250 pounds. The spraying must be done thoroughly to penetrate their woolly covering and wet their bodies.

Remedies for Woolly Aphis

I find that tobacco, in some form, is the universal insecticide for aphids, while there are a few that recommend dilute miscible oils and kerosene emulsion. But I found that the latter sprays are injurious to the roots and kill the tree in many cases. Carbon bisulphide as for the grape phylloxera has been recommended, but it is not practical for the nurseryman.

No doubt the kind of soil trees are grown on has something to do with root infestation. A hard soil, soil that cracks, allows the lice to migrate to the roots. Cultivating the trees constantly is a good thing to do so, that a strong ground will result and will keep the soil loose and prevent their movements.

The aphids may be destroyed on the foliage by spraying 7 per cent kerosene emulsion miscible oils, whale oil soap, 1 pound to 6 gallons, or tobacco extract, 1 part to 70 of water. These should be applied in a strong spray so as to thoroughly wet and penetrate the waxy covering of the aphides.

The winter spray of lime sulphur wash destroys the hibernating aphids on the trunk and, doubtless, kerosene emulsion or miscible oils applied early in the spring, as for the San Jose scale, would probably destroy the eggs.

Year Book (Agr.) 1906, page 446, states the value of lime-sulphur destroying the winter eggs of aphids affecting the foliage and twigs of the apple, as demonstrated by Prof. J. M. Aldrich.

Several insects prey on the woolly apple aphis but are not an economic factor in the control of this pest.

The economic problem in the nursery is essentially different from that in the orchard because the inspection insists on stock being entirely free from any sign of the presence of the aphids. Badly infested stock should be destroyed. It would be a good practice to dip all trees in a soap solution or lime-sulphur wash to destroy any aphids as well as San Jose scale.

Selection of Varieties

By C. D. Platt, Iowa

"OH! THAT question is merely a personal matter," is the answer one will usually get when asking for advice on the selection of varieties for a commercial orchard.

To a certain extent this is true, but there are certain definite things to consider that apply to almost every case. A great many mistakes have been made in selecting varieties which will prove profitable, and there is no question but that the prospective orchardist should study the situation pretty carefully before deciding what varieties to set out.

A tree should be a heavy bearer if it is to be planted commercially. This may seem a simple statement but it is one that is frequently overlooked by those planting orchards. Many people judge an apple merely by a certain fruit they see and if the fruit is handsome the variety is presumed to be a good one.

The fact that the Ben Davis tree is such a heavy bearer is probably its only just claim for being planted commercially, since the tide of public opinion is against it so strongly.

Age, Color and Quality

Another question to consider is how long one must wait before a tree begins bearing. If one variety doesn't come into bearing until 15 years old, the chances are that the orchardist will not get as great returns as from trees that begin bearing early. Of course, if the apple is a variety which is in much demand, and will bring a good price on the market, the grower would be justified in planting it even if it was a late bearer.

Good color in the fruit is a good point to have in a variety for commercial planting. People will continue to buy with their eyes and they probably always will prefer a bright red apple to a green one. The fruit-grower is really dependant on the public, so he might as well grow red apples and satisfy his customers.

It is probably the best plan in the long run to grow apples of good quality. Most households can use ten barrels of apples in a winter if they are of good quality, but can get along with one if the apple is of poor quality, and not feel the loss to any great extent.

Ben Davis Not Popular

If a person has to take a glass of water with his apple, which is usually the case with the Ben Davis, the consumption will likely be low. If one has the reputation for growing high quality apples he will find a ready sale for his product and the people will not be so particular as to what they pay for it.

People who came to the orchard where I was working last fall, did not seem to object to the price of $2.00 a bushel for Jonathan but hesitated when they were told that they were sold bushel for bushel with Ben Davis, which sold at $1.35. They did not like the idea of "substitutes" as they called the Bens, but took them to get the Jonathan. I might also add that it would have been very difficult to dispose of the Ben Davis if this plan had not worked successfully.

There has been some discussion, in regard to discarding the Ben Davis entirely from the planting list for a commercial orchard in the middle west. The reason for this is the extreme weakness of this variety in regard to blister canker. This fungous disease has been increasing very rapidly in the past few years among the Ben Davis trees.

The neglected orchards are the worst. The disease can be checked by chiseling out, and if the orchardist uses a little disinfectant he can keep this disease under control.

I saw a splendid example of a method by which the canker can be spread, when I was pruning in an orchard, last summer. The pruners, who had gone through the orchard the year before, had spread the disease by their pruning tools. The use of a little kerosene would have eliminated all the work we had to do in removing these tiny cankers which were starting around every pruning wound.

"Don't get too many varieties," is another piece of advice often given, and one well worth heeding. A few good standard kinds will usually pay best and are easiest to sell to wholesalers. If one follows all these precautions and studies the different varieties before planting, he will be amply repaid when his orchard comes into bearing by not having a lot of odd kinds that are not desirable for a general market.

FRUIT ON MOUNTAIN FARM

By Adda C. Hall, Tennessee

My brother lived 30 years ago on a rough mountain farm of 30 acres. He and his young wife began to plant fruit trees the year they married, and I don't suppose a year has passed since that they have not set out a few.

They have many different varieties of apples, from the earliest in June, till the last ones are picked and stored in the cellar in November and December. They always have apples until February —often later.

They have many different kinds of pears. They have plums, peaches, grapes; in fact every kind of fruit that can be grown here.

The rough mountain fields, whose soil is very fertile, seems adapted to fruit of all kinds.

The neighbors laughed at my brother for planting so much fruit so far from market. When the trees began to bear, he and his two sons hauled apples 25 miles over rough roads to market. Often at first he got only 25 cents per bushel for apples and 75 cents for pears.

He kept going into debt for more land, and the fruit went a long way toward paying for it. As fast as one farm was paid for another was bought, until now he and his son own between three and four hundred acres.

He has built a nice house in the shadow of the mountains, bought a car, and makes more money every year than any of his neighbors. His cellars are filled all the time with rows of canned fruit. He has dried fruit, jellies and preserves, apple, peach and pear butters on his table the year round.

A large drove of hogs is fed in the orchard each year: he has a market near his home now and sells a great deal of fruit every year. His orchard has paid him in every respect.

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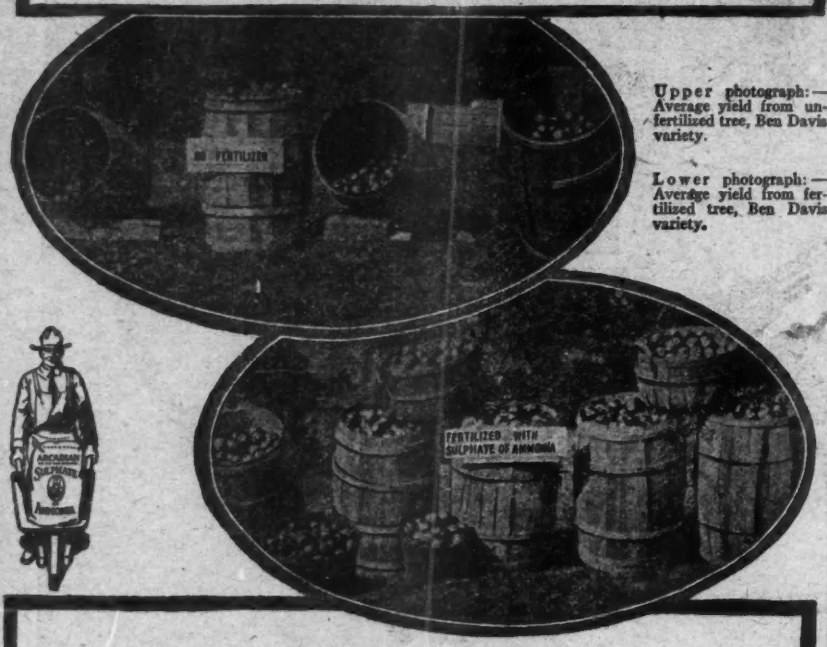

Upper photograph:—Average yield from unfertilized tree, Ben Davis variety.

Lower photograph:—Average yield from fertilized tree, Ben Davis variety.

Orchard Fertilization Experiment—1918

Everett Craig, Mt. Healthy, Ohio

Variety: Ben Davis.

Fertilizer Treatment	Grades Figs refer to diameters of apples. Below 2¾ in.	2¾-2½ in.	Above 2½ in.	Total Picked
No Fertilizer.	4.5 bu.	2.0 bu.	0.25 bu.	6.75 bu.
Sulph. of Ammonia, 4 lbs. per tree.....	7.0 bu.	7.5 bu.	2.5 bu.	17.0 bu.
Gain.....	2.5 bu.	5.5 bu.	2.25 bu.	10.25 bu.

Variety: Rome Beauty. Average Yield per Tree

Fertilizer Treatment	Grades Figs refer to diameters of apples. Below 2¾ in.	2¾-2½ in	Above 2½ in.	Total Picked
No Fertilizer.	0.375 bu.	1.0 bu.	5.0 bu.	6.375 bu
Sulp. of Ammonia 4 lbs per tree...	0.25 bu.	1.0 bu.	13.5 bu.	14.75 bu
Gain..... (loss)	0.125 bu.	none.	8.5 bu.	8.375 bu.

These tables give a very clear idea as to the value of fertilization in orchards. Fruit growers should study the results carefully, and draw their own conclusions as to why they should fertilize their orchards.

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The Mid-West Fruit Show

By Thomas F. Rigg, Iowa

THE Mid-West Exposition, held at Des Moines, Iowa, November 11 to 14, was the best balanced horticultural show ever held by the Iowa people, and in this respect has never been excelled by any such show anywhere in the United States.

Professor Beach nicely stated the fact when he said "there is a pleasing completeness about this show." That's it—a pleasing completeness in the balance of apples, flowers and forest products.

Commercial apple growers of five states brought the best they had, and it was necessary to use all of the balcony space for the overflow from the great floor of the building. No finer apples were ever shown. This statement is beyond dispute. The fact stood forth boldly that the growers are now practicing the best known cultural and spraying methods. The color and finish of the apples was evidence of this.

It was a battle royal between Indiana and Iowa exhibitors, and when Prof. W. H. Alderman, assisted by Prof. J. H. Allison and F. O. Harrington announced the sweepstake awards it was found to be about even break between these two states.

R. A. Simpson, Indiana was fi st for best five boxes, with Winesaps. Best five bushel baskets went to Robinson Bros., Indiana, these being Grimes Golden. Clarence Bowers' Jonathans were first for the best box. Mr. Bowers also won best five plates with Winesaps. D. C. Webster, Minnesota got in between the firing squads and ran away with first for the best barrel, turing the trick with Delicious. Geo. A Schurk of Iowa, made a splendid winning, taking first for the best ten trays with Jonathans; first for the best five trays with Grimes Golden, and first for the best plate with Grimes Golden.

No finer showing of vegetables has ever been staged in the mid-west. Minnesota and Wisconsin were the chief contenders, Wisconsin getting somewhat the better of the battle.

Judge Field's task was no easy one. His findings were acceptable to all exhibitors. It was stated by competent judges that the potato exhibit was the best ever made in the United States.

One of the most pleasing features of the show was the nut and forest foods shown by H. F. Pumphrey. Here were fifty-three varieties of nuts, all of which were grown in Iowa. Pecans from a wild grove near Montrose attracted especial attention. It was the united opinion of those interested in nut culture that this grove ought to furnish scions which should be used by the thousands in this section of the mid-west, for propogation purposes.

The educational features of the exposition were varied and of great value. There was the daily demonstration on pruning and spraying of fruit trees; grading and packing apples for market. The whole field of home economics was well covered by demonstrations and talks. The program of the Boys' and Girls' Club work was a very complete and interesting one. The importance of this work is beyond measure.

The social features of the show were very pleasant. Every grower present was stimulated to do better work in the future, and his confidence in himself and the dependability of the mid-west as a commercial apple growing section became to each and every one a settled fact and worthy of exploitation.

Things That Make Trees Set Big Crops

(*Continued from page 8*)

is the formative period, when we are building up the frame work of the tree.

Intensive tillage will aid in conserving moisture in the ground and encouraging the production of nitrates available to the tree. Pruning generally consists of heading in the top in order to force out laterals, and in doing this we are restricting somewhat the carbohydrates, but, if not over-severe, not to an extent that the tree does not possess enough of them for growth. The result is that our tree is all wood. If we carry out this same practice until the tree is six to ten years of age we get nothing but wood, and too many of us have had that result, but if we begin to reduce or cease the tillage, or even perhaps put in a grain crop, or do very little pruning and what is done mainly a thinning, there is a relative increase in the carbohydrates and a decrease in nitrates. The tree passes from the second stage into the third and soon comes into heavy bearing.

The trees may now grow along beautifully for four, five or six years, produce heavy crops, make pretty good growth, and we are very much satisfied. But soon the growth begins to get less, the leaves become thin and yellow, the trees while blooming set very poorly. Our trees have evidently entered into the decline. What has happened? Why, we have allowed them to slip into condition number four. Relatively the nitrates and moisture have not increased or kept pace with the area capable of manufacturing sugars and starches, and because of lack of their utilization accumulate as such. Our trees may be packed with sugar and starch, yet are virtually starving to death, if they have not enough nitrate to utilize this sugar and starch.

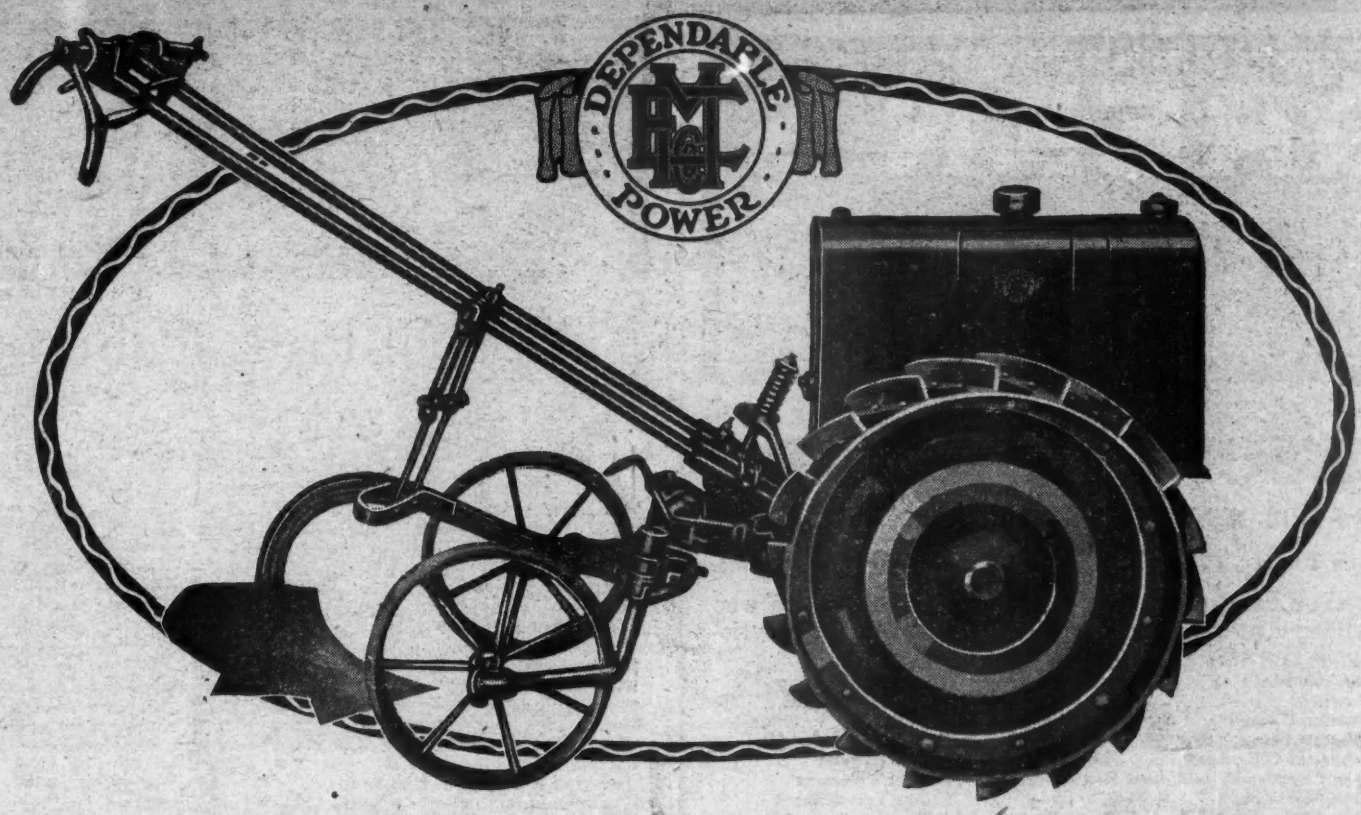
Adding nitrate of soda, three to five pounds per tree, in March, as we have in Hood River and Rogue River for many of these devitalized trees, immediately causes a transformation and brings the trees back to the third condition, namely, plenty of vegetative growth and abundance of fruit. Why? Simply because the addition of that nitrate restored the balance in the tree. Often by pruning trees such as we have mentioned, some of the sugar and starch are removed, and in that way a fruiting balance between the sugar, starch and nitrate, has been restored. That is why a general pruning, well distributed over the bearing tree, a pruning that is not too severe, will help to keep up the balance between the nitrates and sugar and starch.

What the Big Problem Is

We can say then, that the great problem in our orcharding is to so control the moisture and nitrates on the one hand and the sugar and starch or carbohydrates on the other hand, that we can mould our trees in such a way as to secure any results we may desire. That pruning, tillage, fertilization, irrigation, all affect the correlation between these two classes of food. That if we greatly allow nitrates to become excessive on the one hand, or the carbohydrates or sugar and starches, so to speak, on the other hand, we must not expect a lot of fruit and proper vigor in our trees. As far as our bearing trees are concerned, we must try to keep a fair balance between these two.

Since the experiments have been conducted on apples and tomatoes, other investigators have been conducting some experiments on wheat and other grains with exactly the same results, indicating that these fundamental principles which were brought out by investigations with apples and tomatoes may hold true with practically all agricultural plants. The results published in bulletin 149, therefore, apply to general agriculture, and we are very happy at the Oregon Experiment Station that such a publication has been issued by our station, a publication which is not only fundamental and of inestimable value to the agriculture of Oregon, but to the agriculture of the world.

It has opened up for us a great field of further investigation because we see that we now have many leads for new investigation, that undoubtedly we can better interpret many of the abnormal conditions of the trees by a better understanding of the relationship between the nitrates and carbohydrates, and it is not too much to expect that many of the so-called functional troubles of our trees may be due to a large extent to the cause of wrong relationships in the tree between such elements. We may look forward with great expectancy to further investigations which will be of great value to our agriculture.



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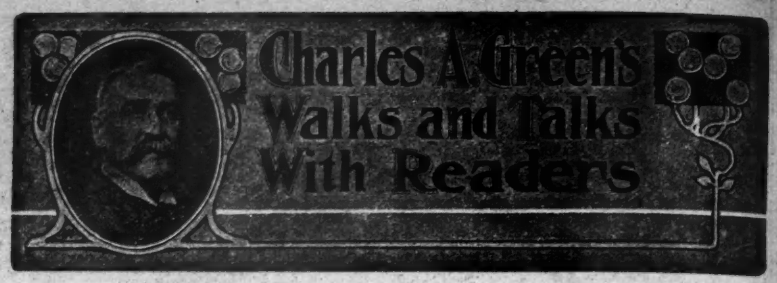


A Small Fruit Plantation

WHAT a poor man can do with a little garden patch in or near a village is surprising. Supposing he has one-fourth acre of garden and plants it to the strawberry. Consider the large income, as it would appear to the small planter, from this little piece of ground and how it would fill his pocketbook at a season when it might otherwise be empty. But I would not advise planting the entire one-fourth acre to the strawberry. I would advise planting half of this piece of ground to the black and red raspberry. These fruits would ripen at different dates, enabling the owner to get the fruits picked by his own family. Such a fruit garden as this would be a blessing to many villages where the supply of fresh picked berries is often inadequate.

How sad the thought that so few take advantage of an opportunity like this I have suggested. If the poor man who desires to start in his small plantation feels himself too poor to make a start even in the small way I have suggested, he could plant a hundred or so of the strawberry and an equal number of the raspberry and increase his planting from the natural increase of his own plants. The plan I have suggested will require enterprise. It always requires enterprise to branch out even in a small way in something that is new to the individual. I never advise the inexperienced man to start largely in anything. He should start in a small way and gain in experience as he progresses.

Wintering Black Caps

There are two kinds of black cap raspberry plants. One is the plant that is produced by burying the tips of the plant in a perpendicular position two to four inches deep in loose soil in August or early September. The buried tip sends out roots and in a month or so thereafter a well rooted plant with a white germ that makes the fruiting plant. These plants do not look like raspberry plants but somewhat resemble asparagus plants. I once sold some of these tip plants to a patron who complained that he received asparagus plants instead of raspberry plants, mistaking owing to resemblance.

The other black cap raspberry plant is the tip plant transplanted, which any one would recognize as a raspberry plant. There has always been difficulty in wintering tip raspberry plants but I have succeeded by heeling them in moist sand, not wet, in a cellar that does not freeze severely and which is not warmed by a furnace. The plants are tied in bundles of 25 each and spread open as far as possible around the roots and laid in a shallow trench and covered with sand, not deeply, but just enough to cover all of the roots.

Another plan has been to prepare a smooth piece of cultivated ground, sandy preferred, where water will not stand. We trench the raspberries here and cover the roots lightly as recommended for cellar storage, and then cover the plants with enough straw or strawy manure to prevent severe freezing. Where the plants are covered too deeply I have known them to smother and some times to mildew where buried deeply and covered deeply during warmish weather outdoors.

There is great gain in digging raspberry plants in the fall when the pressure for labor is not so intense as in the spring, therefore nurserymen so far as possible prefer digging the raspberries in the fall and storing them as indicated above.

The White Grub

If you were told that the May beetle so-called, the big, blundering beetle that dashes wildly into your face or against the windows in the early summer, is a very destructive beetle, you would ask how can it possibly do much harm. It does not do noticeable injury in its flying condition, during which it simply feeds upon the foliage of the trees and other green things.

The damage done by the May beetle begins when it lays its eggs. When these eggs hatch into little grubs they begin to penetrate the soil. The first year of this grub's life is not remarkably destructive. The second year each egg becomes a ferocious creature devouring the roots of many plants. Even the timothy sod has been devoured by the white grub and the roots of corn.

It is upon the roots of the strawberry that the white grub most greatly delights, therefore the experienced strawberry grower would not think of planting strawberries on a freshly turned sod. The longer the sod has been left unbroken by the plow, the more fully it is infested with the white grub. The work of the grub is first noticed by the wilting of the foliage of the strawberry. The wilting is caused by the root having been eaten off entirely or partially by the grub. If you will go over your strawberry plantation when you see these wilted plants and dig with a hoe you will uncover the white grub and destroy it, but if the soil is badly infested you have almost a hopeless task and it would be more economical to start a new plantation than to endeavor to kill all the grubs engaged in their destructive work.

The white grub is most successfully caught and destroyed by fall plowing. Even if the plowing cannot be done until early winter, many grubs will be upturned and destroyed by frost or by the birds or fowls. By midwinter the grubs have descended below the depth reached by the plow. Ground that has been occupied by a crop of corn or potatoes is much safer than soil which has not been disturbed over one year by thorough cultivation.

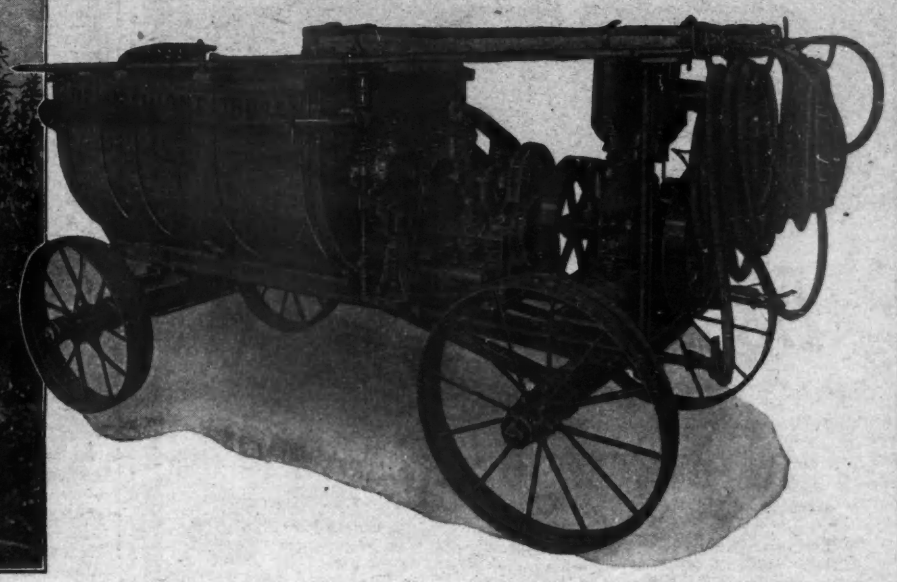
Pear Blight

A fruit grower recently states that he considers pear blight a serious menace to the pear orchard, not only on account of its effect upon the pear trees but for the further reason that the blight is carried from the pear trees to the apple trees adjacent. I am surprised to learn that pear blight can be conveyed to apple trees. Pear blight is disseminated from one tree to another by the saws or other tools used in cutting out the diseased wood. No saw that has been used in cutting diseased branches from a pear tree should be used to prune another tree previous to being sterilized.

Not far from my office in Rochester, N. Y., is an extensive pear orchard owned by David Bell. I pass this orchard frequently and have been through it admiring the beautiful specimens produced, but I have never seen a tree or branch affected with pear blight in this orchard, but if there should be a pear tree in this orchard affected by pear blight and the branches should be sawed off and burned, as should be done, and the same saw were used to prune other trees in this orchard without disinfection, I should expect to see many blighted trees in this beautiful orchard. In other words, I do not consider pear blight so serious a problem as does the correspondent I mention and do not think it will ever prevent the growing of pears in New York state.

Rhode Island Greening—This is the "Greening apple" of American markets. It is a good dessert variety when well grown, and a most excellent sort for cooking. It is one of the varieties on which the fame of Western New York as an apple-growing section is founded.—*Rural New Yorker.*

Don't buy a Power Sprayer until you get our book—it tells why every man who needs a Sprayer should have the advantages offered only in the "Bean"



Power Sprayers
That Are Different
In Money-Saving Ways

THIS is to tell about a power sprayer for your fruit trees that is unlike others in some amazing ways. It is called the *Bean Spray Pump*. Its differences result in important savings in time, annoyance and expense.

They mean a higher degree of efficiency in spraying—better protection—better yields.

They come to you, all on one machine, only in the "BEAN" Power Sprayer, invented by John Bean.

A Famous Pressure Regulator

A famous pressure regulator, a patented "BEAN" feature keeps the pressure uniformly at the desired point. It saves fuel, wear and tear. It is found in no other pump.

It is dependable and safe. And it permits the removal of all threadless ball valves in two minutes with *300 lbs. pressure* on the pump and *engine running*. Contrast that with spending half a day in getting some valves out.

Valves Washed Out While Open

Another feature is an underneath suction which permits the washing out of valves while open, and you don't have to wait for pressure to be discontinued or started when this cleaning is necessary.

All men who work with sprayers want time saving features such as these.

Slow Speed-High Pressure —This Saves Wear

The "BEAN" is a large, slow-speed, heavy duty pump. Slow-speed means less friction, and less wear, and allows the valves to close perfectly, preventing back slippage of liquid.

This gives the highest efficiency of any outfit yet known. We use the famous "Novo" Engine, a reliable, sturdy power plant.

Friction-Saving Features

Another wear-saving feature is the "BEAN" Eccentric Drive, providing a vastly larger wearing surface than crank shafts do. A guide on the plungers keeps them constantly in line, which further minimizes friction.

Because of valve operation and type of plunger used there is no friction in the "BEAN" pump's up-stroke, which saves power as well as wear. So the friction of both metal and liquid has been minimized in "BEAN" *Power Sprayers* to the greatest degree that is possible in a power sprayer today.

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And in the "BEAN" we have ended for all time all troubles due to the harmful effect that spraying liquids have on brass.

"BEAN" cylinders are porcelain-lined, which means the end of all grit troubles.

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The "BEAN" is the only spray pump without stuffing-boxes and the troubles that they cause.

John Bean, the Inventor

JOHN BEAN built the first high pressure spray pump with air chamber in 1883 for the purpose of controlling the San Jose Scale which had been ruining fruit orchards.

The third generation of the family now builds the famous "BEAN" *Power Sprayer*, the foe of orchard pests. The present machine combines all the best improvements that 36 years' experience has developed in this line. The "BEAN" is today, as in 1883, the leading power sprayer.

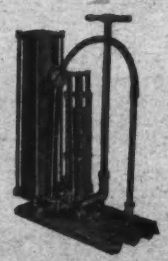
Learn More—Get Our "Sprayer Book"

You want to make all the savings that the "BEAN" Power Sprayer permits if you want to spray at the lowest cost. There are still more facts that you should know before you buy any other type. Send for the book that explains other money-saving ways in which the "BEAN" excels. Note the other important differences between the "BEAN" and others. Then decide which sprayer will serve you in the most efficient way.

"BEAN" Power Sprayers

Invented by John Bean

"Bean" Little Giant Duplex



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Please send your "Sprayer Book."

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Photos Courtesy W. Va. Exp. Station

Fertilizer Doubled the Yield

IT PAYS to fertilize fruit trees liberally. This fact has been proven in numerous tests in recent years.

In peach orchard experiments in West Virginia, fertilizer doubled the twig growth, increased the leaf area four times, increased the set of buds by 50 per cent, and *doubled the yield and very nearly doubled the net returns from the orchard.*

Practically all fruits are borne on new wood. This is true of both apples and peaches. Ammonia in the fertilizer produces the proper growth of bearing wood. Applied just before the blossoms open, it increases the set of fruit and produces the fruit spurs for the next year's crop. Potash strengthens the wood growth and, whenever it is deficient in the soil, it should be supplied in the fertilizer. Phosphoric acid is necessary to mature the crop and produce healthy, natural control of the new wood growth.

Fertilizer is the quickest, safest and most effective means of supplying the ammonia, phosphoric acid and potash for increased fruit production. In Pennsylvania the use of complete fertilizer on apples increased the average acre-yield by 125 bushels. In southern Ohio 2½ barrels per tree were grown with fertilizer as compared with one-quarter barrel without fertilizer. Fertilizer also increases the growth of humus-producing crops in the orchard which help to keep the soil in productive condition.

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"Fertilizers—What They Are and How To Apply Them."

"High Analysis" Fertilizer for Peaches

The figures represent percentages of ammonia, available phosphoric acid and potash, in the order given:

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6-8-0	Loam Soil	7-8-3
6-8-0	Clay Soil	7-8-0

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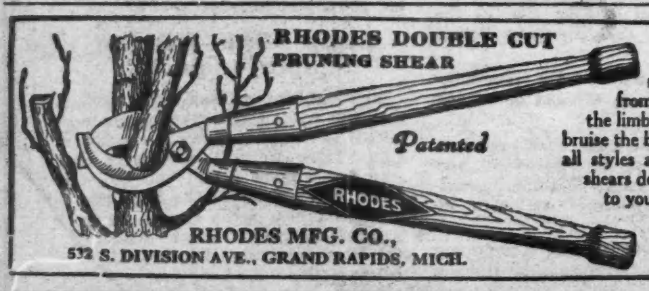

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Solving Orchard Problems

By Paul C. Stark, Associate Editor

Pollination of Fruits

Q.—Will you, or some of your readers give me some information regarding the pollination of the different varieties of apples. What varieties are dependent wholly, or in part on other sorts to set a crop? I am especially interested in Yellow Transparent, Wilson Red June, Winesap and Rome Beauty. I have fruited the last two named for the last 20 years with other sorts planted with them. But planted that way makes them more tedious and expensive to gather. Are Alton, Elberta, Capt. Ede, and Belle of Georgia peaches self fertile?—H. L. N., Kentucky.

A.—The question of pollination is one which has not been worked out as fully as some other factors in orcharding. Another thing that makes it hard to advise, is the fact that it varies in different climates. Some varieties may be self fertile in the north and practically self sterile in the south. However, as a general rule, you should have several varieties of similar blooming time planted fairly close together to get the maximum cross pollination. You will find some orchardists who plant in solid blocks of a single variety and they claim that they get good crops. But the pollination question is of considerable importance, particularly in years when the weather conditions are unfavorable for pollination. It is the wet, misty weather during the blooming period that often causes a poor set of fruit and it is the man who has considered cross pollination that will stand the best chance for a crop

In my orchard which I am planting this fall, I have planted four rows of a variety, letting every other 4 rows be the same variety until I had planted all of that variety. Then I alternated two other varieties, etc. My aim being to get cross pollination and at the same time hold all the rows of each variety as close together as possible. I have also planted in as long rows as possible, because a larger acreage can be put in the 4-row unit and still get the same advantage of cross pollination.

I decided to use the 4-row unit, but some orchard men thought 8 rows would be better. Either the 4 or 8-row rows make it convenient for picking and other orchard operations.

Yellow Transparent and Wilson Red June should cross pollinate satisfactorily. Rome Beauty is a late bloomer but its blooming season will overlap the Winesap. Jonathan is considered a rather poor pollinator, and should be planted with other varieties.

Of the peaches you mention, all will bear I believe either singly or together. In my experience, pollination of the peach is not such a factor as in the apple.

Varieties to Plant

Q.—Will you please answer the following questions:

In buying a farm with no apple trees on it, we desire to plant standard varieties but would like to have some apples for home use as soon as possible. What varieties of summer, fall and winter apples come into bearing soonest? Is there any difference in the adaptability of varieties to graft successfully onto wild apples or natural fruit?—O. B., New York.

A.—For early bearing varieties for home use I would advise you to plant the following, given in the order of ripening: Yellow Transparent, Duchess of Oldenburg, Wealthy, Wagner, King David, and Rome Beauty.

A Geneva, N. Y., Experiment Station bulletin recommends the early bearing and other qualities of the King David. The Rhode Island Greening, Baldwin and particularly the Northern Spy are late bearers, and I agree with many of the New York state fruit men who believe that these varieties have been too largely planted to the exclusion of better and more profitable sorts.

Answering the other question, the success of top-grafting depends more on the care exercised in doing the grafting and later attention than it does on variety variance, although there would be more or less difference in the varieties.

Hypodermics for Trees Again

Q.—The enclosed clipping was handed to me by a friend who failed to get the name of the publication from which it was clipped. Of course the information, if it could be called "information" which it gives, is worthless, as it fails to tell the amount of the different ingredients to be injected, and also the manner of making the injection. In my opinion I am wasting my time as well as yours in writing you, but would like to have your opinion as to the hypodermic treatment of fruit trees; whether such experiments have been conducted, and if so what results.—W. T. D., Georgia.

The clipping referred to is as follows:

"As a result of recent experiments in science, it is claimed that the days of the woolly aphis, the codlin moth and other fruit pests are numbered. The new process of fighting orchard insects is unique. A hole or socket is bored into the trunk of the tree and in the opening is deposited a compound to be taken up by the sap into the branches of the tree.

"It is claimed that not only are fruit and tree pests thus destroyed, but that the tree, by its absorption of the injection, is made healthy and thriving.

"The compound injected into the tree consists of gunpowder, saltpetre, copperas and sulphur. Pulverized and mixed and applied according to a patented process, the ingredients are said to be readily absorbed by the tree.

"Thoroughly diseased apple and peach trees experimented upon were purged of their pests, and the quality of the fruit improved and the trees grew sturdy under the tonic effect of the insecticide."

A.—Our subscriber is right. It is a waste of time to experiment with this old scheme. Furthermore, I have known of trees being killed or seriously injured by various materials which were put into holes in the tree trunk. With minor changes, this scheme crops out in different places from time to time, and many people have asked me about it. I do not know what publication printed the above quoted article, but far greater care should be exercised in publishing advice which is not scientifically correct and which may prove injurious. From the article quoted above, this so-called "hypodermic" is supposed to control many and various insects. Of the two named, the codling moth is an eating insect, while the woolly aphis is a sucking insect. These represent two great classes of fruit insects, one of which, the eating insect, is controlled by poison sprayed on the fruit and foliage; the other class, sucking insects, being controlled by a contact spray which kills when it hits the insect.

Thus it requires different types of sprays to control the sucking and the eating insects, although some of the apray materials can be mixed and applied at the same time, thus controlling both types as well as some of the plant diseases.

The recommendation for a hypodermic for trees quoted above, is evidently founded on the theory that the tree has the same type of circulation system as the human body. But that is incorrect. In the human body, the blood is continually circulated throughout the body, being purified by the lungs and pumped by the heart. In the tree, the sap, which is a solution of plant food and water is absorbed by the roots and travels to the foliage, which makes the plant food available for the tree, and the water evaporates from the leaves into the air.

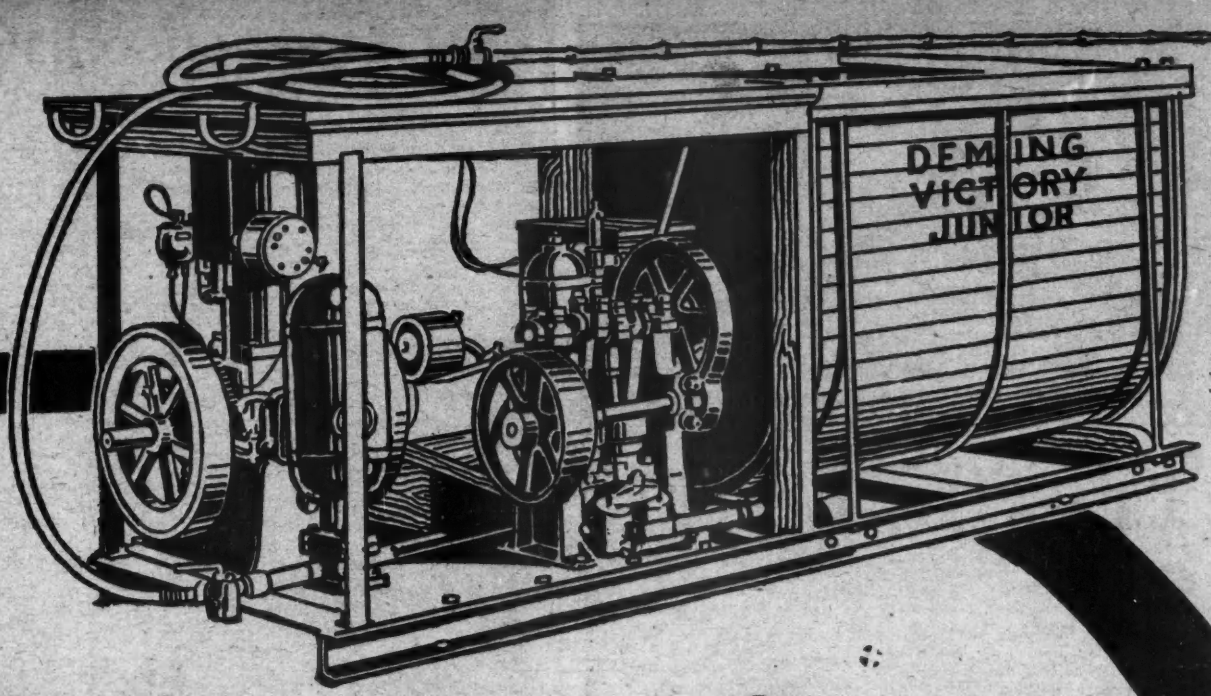
I have given this simple explanation so it could be understood that a "tree tonic" that depended on a circulation system in the tree similar to that in the human body, could not be expected to benefit the tree because the tree and the human body are entirely different.

Scalecide and Blight

Q.—I am writing to you for information in regard to Scalecide. Do you know anything about it, whether it is injurious to the trees, and good for blight? Do you know of it being tried out and as good as they say it is? Can you give me any information in regard to it?—W. A. L., Arkansas.

A.—Scalecide is a miscible oil that can be applied to the trees in their

(*Continued on page 29*)



Deming "Victory Junior" Power Sprayer, Fig. 729 Has 2 H. P. Engine and 4¼ gallon high pressure pump. Other features—suction box and clean-out strainer between pump and tank; large air chamber; automatic pressure regulator; all steel frame and platform. **May be mounted on any farm wagon truck.**

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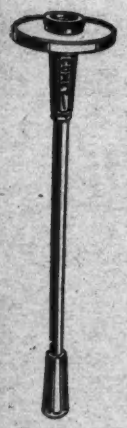
LARGE growers can't afford to gamble with undersized equipment. The bother of frequent re-mixing and re-filling often means half-hearted, over-hasty spraying—a costly waste of time and energy and a big loss in profits

Thoroughness counts! Get a sprayer to fit the job. Drench the trees with a powerful, penetrating spray—reach every bug and egg hidden under the leaves or lurking deep in crevices in the bark.

Large growers find the Deming "Victory" Sprayer with 200-gallon tank and a capacity of 8 gallons per minute, or the Victory, Jr., with 150-gallon tank and a capacity of 4¼ gallons per minute, the cheapest sprayers possible, *when measured by results.*

There are 25 varieties of Deming Sprayers to fit every spraying need. The name "Deming" on a sprayer, whether bucket, knapsack, barrel or tank type, is a guarantee of effectiveness and ease of operation. It spells s-i-m-p-l-i-f-i-e-d spraying in every case.



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Deming "Comet" Spray Gun does the work of two men with spray rods; quick acting control; light, neat, strong, simple, convenient and moderate priced.

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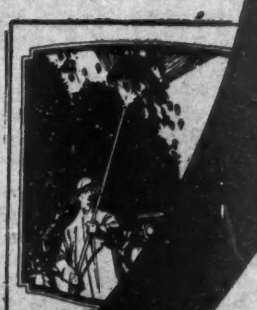
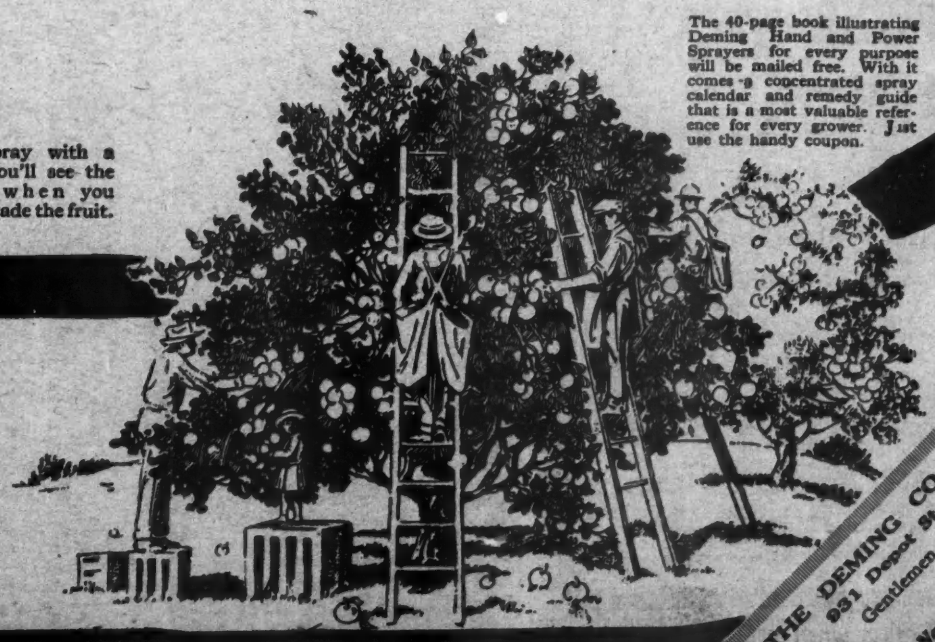


The 40-page book illustrating Deming Hand and Power Sprayers for every purpose will be mailed free. With it comes a concentrated spray calendar and remedy guide that is a most valuable reference for every grower. Just use the handy coupon.

If you spray with a Deming you'll see the difference when you pick and grade the fruit.



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Make This Possible

They supply the necessary available plantfood—ammonia for a quick start, potash to make stout, heavy stalks and big grain, and phosphoric acid to fill out the grain, reduce the number of barren stalks and bring the crop to maturity ahead of frost.

Our Agricultural Service Bureau has been making farm tests with fertilizer for many years, to determine the best fertilizers for various crops under different conditions of soil and climate. The Bureau issues bulletins dealing with the culture of important crops, the use of lime and fertilizer. The Bureau also tests soils as to their need of lime, and gives advice on agricultural matters. This Service is free. Dr. H. J. Wheeler, formerly Director of the Rhode Island Agricultural Experiment Station, is in personal charge of the Bureau.

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Making Sand-Clay Roads

By H. J. I.

OFTEN as one drives over an earth road in territories where the soil varies from sand or light loam to a heavy clay one will come to a piece of road that seems to be much smoother or less muddy than any of the rest of the surface. Many people will pass over this without giving it a second thought. However, if inquiry is made among local people it will be found that this particular piece of road is always in better condition than the rest.

The questioner, if he will then try to find out why this is true will undoubtedly find there is a natural sand-clay road at the place in question. That is, nature has made a proper mixture of the sand and clay at this point. These two road building materials, sand and clay, each possess qualities that are opposite. Sand is loose and lacking in binding materials while clay is just the opposite. Put the grittiness of one against the plasticity of the other and mix them together and you will find a fairly smooth hard surface resulting from the operation.

These two materials, sand and clay, are quite universally distributed over certain sections of the country and occur in large quantities. Unfortunately there are some sections that are entirely sand and others that are entirely clay, but through all the glaciated portions of the Mississippi Valley one will find both of these materials in fair abundance, especially if some care is used in seeking them.

Such a road is useful where there is a fairly light traffic. That is, one where it is only necessary to care for the local farm traffic, and it is also a good type of road to construct where funds are very small as it can be built for from ⅛ to ⅓ of the cost of the ordinary stone road. It is a type of road that is easily maintained as it is easily repaired by merely adding more material of the same kind which adheres to the old road surface after the first wet spell. It is a type that is not very dusty in dry weather and not very muddy in wet weather.

Making a Sand-Clay Road

The amount of each of the sand and clay to use is about the only problem requiring very much study in this type of a road. There are two distinct classes to be constructed—one where sand is to be placed on a clay road, and the other where clay is to be placed on a sand road. In seeking a clay to put on a sand road there are several things that should be taken into consideration. The type of clay will have a good deal to do with the kind of results that one will obtain. Some clays are more plastic than others and some have a great deal more shrinkage than others. A clay that shrinks, for instance, when dry will expand when wet and the mixture of sand and clay will thus become more unstable than a clay that did not shrink. The better the mixture of the sand and clay the better will be the road. This naturally leads to the question of the proper selection of the materials.

In the first place one should seek to find the piece of road such as was described in the first paragraph, either one that was built by nature or one that was built artificially by man. If such a piece of road is found samples should be taken and the amount of sand contained therein determined by washing the clay out. The mixture then used should be as near as possible as that found in the road giving service.

Making the Materials

In case this cannot be done one should seek a natural mixture of sand and clay in a bank. This is often available. Pieces of this should be taken and subjected to traffic to determine whether or not it contains the right proportions. In case neither of the above can be done, samples must be made of materials that are available. That is, different proportions of the sand and clays available should be mixed together and made into balls and allowed to dry. These balls should then be immersed in water and observed as to how they stand the moisture. Those that slack very quickly have not enough binding material in them. In other words, have not enough of the clay. The mixture that stands the moisture the best will be the best one to put into the highway. After such tests one can make a fairly good guess as to how many inches of clay to put on a sand road or how many inches of sand to put on a clay road.

A Well Constructed and Maintained Gravel Road

In building the clay road on the sand a subgrade should be properly shaped and graded before any clay is hauled on. The mixing process must be thorough and it is carried on by plowing, harrowing, or any means that will tend to mix the two materials. This type is harder to construct satisfactorily than the reverse process of putting the sand on the clay. After a rain the road should be harrowed and dragged and shaped up in order to give it a still more thorough mixing. The first mixing probably will be done dry. If too much clay has been added the road will be muddy and sticky when wet. This can be overcome, however, by dragging some of the sand onto the surface and allowing it to mix with the excess clay.

Where sand is put on clay the same care should be taken with the subgrade, in fact more so as the clay subgrade is much harder to drain than the sand subgrade. Therefore provision must be carefully made for taking off the surface water and undersurface water in case there is any. Like in the first method the material should be thoroughly mixed perfectly dry for the first mixing. After rains, however, this road must be puddled and reshaped just the same as the case of putting clay on the sand.

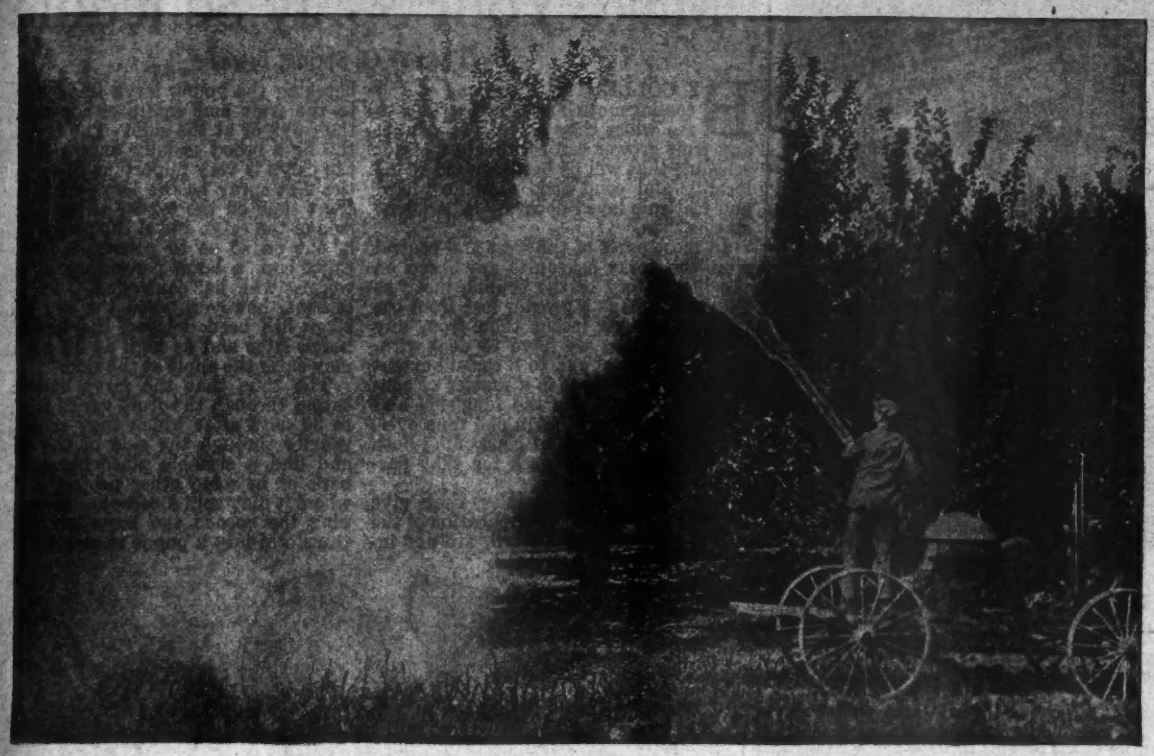
Rules for Road Building

Some one has given the following rules for building these two types of road:

First, for sand on clay,

1. Have the top of the clay grade smooth and about four or five inches lower than it will be when finished.
2. Plow and harrow the top for the width the sand is to be put on leaving it loose but smooth in order to facilitate the mixing.
3. Spread evenly about four inches of sand over the top, then plow and harrow.
4. Spread more sand as required over

(*Continued on page 34*)



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need no introduction to Fruit Growers. You are all familiar for instance with the way they controlled Brown Rot last year wherever used.

Every year a greater number of successful fruit growers are finding the dusting method indispensable in making summer applications. Not alone on account of results, but because it is much faster, cleaner and about 1-3 less expensive taking into consideration both the labor and material used.

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Send today for our free book on Dusting and find out just what Dust Machines and Materials to use to protect Apples, Peaches, Pears, Cherries, Strawberries, Grapes, Potatoes, etc. Our years of experience are at your service. Our free book gives you the careful accurate information gained in successful commercial protection.

For Liquid Spraying and Dormant Dusting

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dissolves instantly in hot or cold water. Assures clean Top-of-the-Market-Fruit. The efficient, economical, practical convenient insecticide and fungicide for spraying all kinds of trees. Absolutely the best spray material for the control of San Jose Scale, Peach leaf curl and other similar orchard troubles.

DON'T PAY FREIGHT ON WATER

One, one hundred pound drum of Niagara Soluble Sulphur compound is equivalent to a 600-pound barrel (50 gallons) lime sulphur solution. This year it actually costs less than any other sulphur spray material. Costs less to haul and handle. No barrel to return, no leakage, no crystallization. Keeps indefinitely anywhere.

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Send me Spray Calendar and data on Niagara Soluble Sulphur Compound ( )

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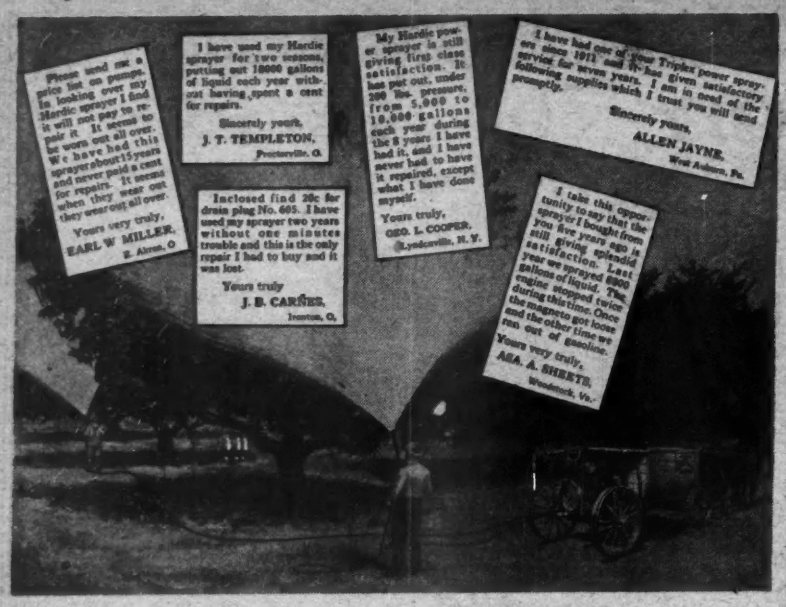
Please send me a price list on pumps. In looking over my Hardie sprayer I find it will not pay to repair it. It seems to be worn out all over. We have had this sprayer about 15 years and never paid a cent for repairs. It seems when they wear out they wear out all over.
Yours very truly,
EARL W MILLER,
R. Alton, O
I have used my Hardie sprayer for two seasons, putting out 18000 gallons of liquid each year without having spent a cent for repairs.
Sincerely yours,
J. T. TEMPLETON,
Proctorville, O.
My Hardie power sprayer is still giving first class satisfaction. It has put out, under 200 lbs. pressure, from 5,000 to 10,000 gallons each year during the 8 years I have had it, and I have never had to have it repaired, except what I have done myself.
Yours truly,
GEO. L. COOPER,
Lyndonville, N. Y.
I have had one of your Triplex power sprayers since 1911 and it has given satisfactory service for seven years. I am in need of the following supplies which I trust you will send promptly.
Sincerely yours,
ALLEN JAYNE,
West Auburn, Pa.
Inclosed find 20c for drain plug No. 605. I have used my sprayer two years without one minutes trouble and this is the only repair I had to buy and it was lost.
Yours truly
J. B. CARNES,
Ironton, O.
I take this opportunity to say that the sprayer I bought from you five years ago is still giving splendid satisfaction. Last year we sprayed 6000 gallons of liquid. The engine stopped twice during this time. Once the magneto got loose and the other time we ran out of gasoline.
Yours very truly,
ASA A. SHEETS,
Woodstock, Va.

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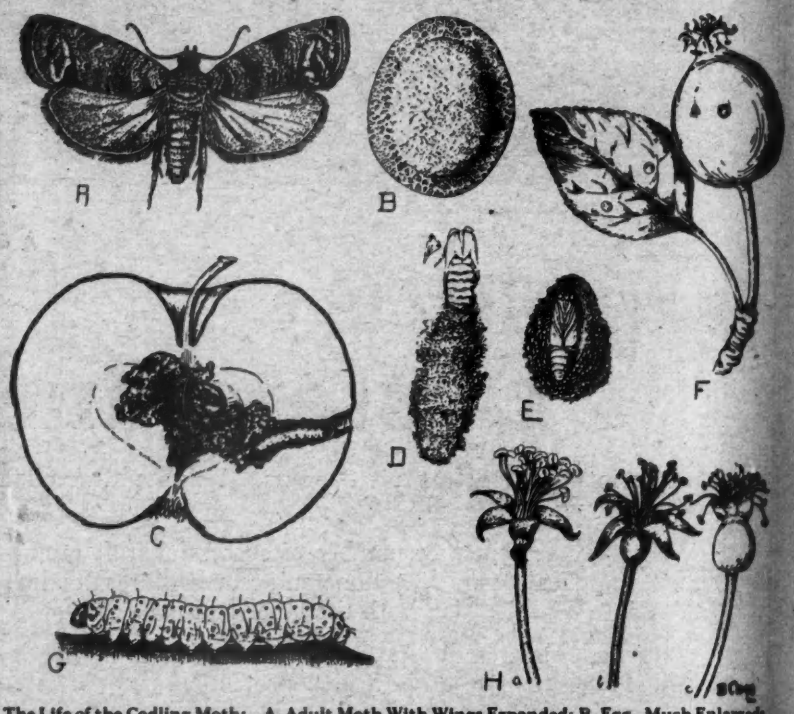
Make Your Spray Schedule

By Thomas G. Spring, Iowa

BY COLLECTING cocoons of the codling moth larva and watching to see when they emerge as adults, any fruit grower can formulate a spray schedule that will be better suited to his locality and conditions than any hard and fast rule layed down by experiment station men.

In most parts of the west and central west the spray schedules are based on the life history of the codling moth as there is perhaps a greater loss from the ravages of this insect than from any other pest that we have to deal with. For scab control and to a certain extent for other diseases it is a matter of convenience to combine the fungicide and the arsenical and thus in one time over, accomplish the task of controlling both the insects and diseases for that particular period.

That spraying schedules that give definite periods for the application of the sprays after the petals fall, are not infallible, has been proved by the experiences of certain growers in Kansas during the past few years. It was found that in certain seasons that the sprays that were put on at the time advised in the spray schedues did not give nearly so high a percentage of clean fuit as was secured by certain growers who had delayed for a number of days after the petals had fallen. After investigation by the entomologists, it was found that the emergence of the moths had been delayed for some reason and instead of having a large percentage of the larva entering the calyx of the apple as is usually the case, that in some instances as high as 85 per cent of the first brood entered the apples at the side or at the stem end. In this case the calyx spray which has been considered the most important of the four sprays, may be delayed and give better results. This will not be the rule but is an important exception.



The Life of the Codling Moth: A, Adult Moth With Wings Expanded; B, Egg, Much Enlarged; C, Half of Worm-Eaten Apple; D, Cocoon With Empty Pupa Shell Protruding; E, Cocoon With Pupa Enclosed; F, Leaf and Apple Showing Eggs of Coddling Moth; G, Caterpillar or "Apple Worm" Enlarged; H, (a) Young Apple Just After the Petals Fall; (b) Cup Beginning to Close; (c) too Late to Spray.

Life of the Codling Moth

Because of the irregularities of the codling moth which cannot be anticipated by casual observation, the value of the knowledge of the season emergence cannot be over-estimated. It is necessary then to clearly understand the life history of the insect.

The adult moth lays its eggs on the surfaces of the leaves, fruit and small branches and the egg laying period may last over a period of several weeks, each moth laying from 30 to 100 eggs. The spring brood hatches in from 6 to 10 days but in the later generations during the warmer weather, they may hatch in from five to six days. Very soon after hatching the young larva finds its way to the fruit and enters either through the calyx or at the side. The fact that the first brood usually enters through the calyx is very important in applying the first spray as the larva feeds for a short time on the tender tissue just inside of the calyx and if the poison spray is put on so as to penetrate into the calyx cup, a large percentage of these worms will be controlled. In some seasons, however, when the egg laying stage has been delayed the larva will hatch later and as high as 85 per cent may enter the apple at the side.

The time that the larva spends in eating through the fruit varies from 21 to 30 days after which they come out, usually through the side of the apple, and find a suitable place beneath the bark or in some other protected place where it may spin a cocoon. After spinning the cocoon the larva may either transform into a pupae in about a week and emerge as an adult moth in another ten days, or it may remain in the larva stage over winter until the warm weather of the spring, when it changes to the pupal stage and emerges as an adult moth within two or three weeks after the petals fall. Very few of the larva transform after August 10th except in rare instances. There are usually two broods throughout Iowa, Illinois, Nebraska, and Kansas, but in the south there may be three broods.

How to Make a Schedule

The following method of determining the proper time to put on the different sprays has been worked out in Kansas by the government and state entomologists, but the method will apply anywhere.

During the summer, preferably through August or September, burlap banks should be placed around a number of the trees. Select smooth bark trees of the late maturing varieties that show codling moth injury.

About the middle of October examine the bands and remove a number (50 to 100) of the cocoons. These should be placed in a wire cage made of common screen wire and should contain a layer of pieces of bark. The cocoons should then be covered with pieces of bark to layer of two inches and the sides and top of the cage covered with oilcloth. This may be done by wrapping the oilcloth around the cage and tying it at the top, leaving the bottom open. The cage should now be fastened in the crotch of a tree and left over winter.

In the spring as soon as the leaves

(*Continued on page 31*)

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APPLES SHOW A YIELD OF 7,140 BARRELS ON SEVENTY ACRES IN ONE YEAR WHICH SOLD FOR $7.00 PER BARREL

The other day we got a letter from one of our subscribers who stated that he was raised on a farm and for a great many years was satisfied with his production. Several years past, he was talking to one of his neighbors and was astonished to find his friend was much better posted on all subjects pertaining to fruit growing and farming, and could hardly realize that his neighbor was making such large returns from his land. In the course of the conversation his neighbor mentioned that the AMERICAN FRUIT GROWER deserved the credit for his success, because it was from reading an article in our magazine that induced him to study up on scientific farming and fruit growing. To-day they are both very progressive and successful men and we dare say their knowledge on fruit growing and farming is equaled by few.

Possibly there is room for you to be more successful and to increase your yearly productioh which also means an increase in your earnings and a larger bank account.

HOW'S YOUR NEIGHBOR'S ORCHARD AND FARM?

Do a Friend a Good Turn

It will take only a few minutes of your time and influence to show this copy of the AMERICAN FRUIT GROWER to a neighbor and to get him to send his subscription in on the subscription blank below or on a separate sheet of paper. His confidence in your judgement will go farther than many letters from us or many visits from our agents.

We advertised a "Good Turn" proposition in our December issue and it was astonishing to us to note the many subscriptions received from our subscribers for their friends which goes to show that they appreciate the help we are administering to them thru the columns of the AMERICAN FRUIT GROWER and also goes to show that these subscribers are broad-minded men and not of a selfish disposition, because they want to pass this good tip along to their neighbors and friends. We are publishing herewith copies of several of the orders received.

AMERICAN FRUIT GROWER, Chicago, Ill.
Gentlemen:
A friend of mine has just shown me the December issue of the AMERICAN FRUIT GROWER, and I have found it very interesting.
I enclose $1.00 for a two-year subscription as per your offer on page 27.
Yours very truly,
J. A. DUCASSE, Oregon.

AMERICAN FRUIT GROWER, Chicago, Ill.
Gentlemen:
I wish to take this opportunity to congratualte you upon the way in which the American Fruit Grower is living up to its opportunities a d is evidently succeeding in filling a long-felt need for a horticultural publication of more than local scope. Sincerely yours,
S. A. BEACH, President,
Iowa State Horticultural Society.

AMERICAN FRUIT GROWER, Chicago, Ill.
Gentlemen:
Enclosed find my check, on which there will not be any exchange, for $2.00, for which please renew my subscription for two years, and also send to my friend, Mr. Eugene Butts,_____your paper for two years commencing January, 1920, he being a new subscriber.
I got this enclosed coupon from one of my friend's magazine, as the last one of mine which I could find was the August number. I do not know if you discontinued my name on your mailing list after that or not. If you did, then extend my subscription three months further. My address is the same as before.
Yours very truly,
E. C. MILLER, New York.

SOME OF THE STORIES FOR FEBRUARY

Fighting Jack Frost
How Albert C. Allen protects his orchard in the Rogue River Valley in Oregon from low temperatures in spring.

Pruning and Training Grapevines
From the standpoint of practice, pruning and training are the most neglected and difficult operations in the growing of grapes. In this article S. J. Bole tells just how to do it.

$270 an Acre from Cherries
Wallace D. Coffin tells of a successful cherry orchard in Door County, Wisconsin, that pays a handsome profit.

Co-operation Makes Berries Pay
How the strawberry growers of Anderson, Mo., co-operate in the marketing of the berries from 450 acres. An interesting story from Harry Bangs, secretary of the association.

The Home Garden
Planning the garden so as to get the most food for the least amount of work. By Prof. J. T. Rosa, Jr., Missouri Agricultural College.

Principles of Tree Growth
Prof. F. C. Bradford, Missouri Agricultural College, in this article tells just how a tree grows.

How to Prune and Train Fruit Trees
Few questions in the raising of fruit trees have produced more differences of opinions than that of pruning and training them. In this article Prof. V. R. Gardener, of the Missouri Agricultural College tells why certain things should be done when pruning trees.

Fertilizing the Orchard
Fruit trees need food. When it pays to fertilize orchards is told in this story by Prof. W. H. Alderman of the Minnesota Agricultural College.

Short Stories

Combining fruits and vegetables
Making a success of cherries
Currants and grapes for profit
Health and Profit in berries
Plant more raspberries
Strawberries for local markets
Handling the berry crop
Grapes on a rocky hillside
Everbearing strawberries
Products and by-products from grapes
How to grow strawberries
Livestock and the farmer
Questions and answers on Nuts
Orchard Problems and their solution
The Orchard Home, etc.

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One dollar inclosed with this blank will send the AMERICAN FRUIT GROWER to your friend for two years, or it will renew his or your own subscription for that length of time after its expiration. For each dollar you send, a two-year subscription will be given according to your direction. This is a special, limited offer, as our regular subscription price is one dollar per year.

Owing to the new postage bill and the tremendous increase during the last year in the cost of paper, materials and labor, the AMERICAN FRUIT GROWER—rather than lower its standard in the slightest degree—is compelled to raise its price from 50c a year to $1.00.

With the thought of our subscribers always in mind, we have decided to give them the opportunity to renew their subscriptions at the OLD RATE—a saving of $1.00. If you wish to renew your subscription, or enter a new subscription, save $1.00 and

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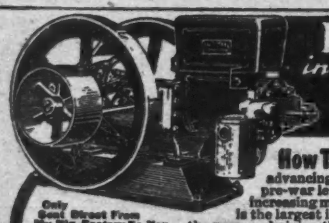

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Orchard Insects and Pests

By F. H. Sweet, Virginia

IF YOU allow insects to sap the life of your fruit trees, you cannot expect to harvest fine fruit. To keep your orchard in a healthy condition, you give attention to the work of destroying most pests in the early stages of their development. It is generally much easier to control them then than it is after they have reached maturity, and have attained appetities that are never satisfied.

The following are some of the destructive insects that the home grower of fruits will find it necessary to fight and control, if he is to have plentiful and well-developed fruit at the time of harvest.

Scales or Sucking Insects

The San Jose scale, the oyster-shell, bark louse, and the scurfy bark louse must all be smothered by spraying them during the dormant season with a lime-sulphur solution, or with oil emulsions. If the spraying has been neglected, whale-oil soap will to some extent keep the insects in check while the leaves are on the trees.

The Tent Caterpillar

In winter you frequently find on the smaller twigs of fruit trees masses of shiny reddish-brown egg clusters about half an inch long. Picking these egg clusters by hand and burning them is the sure way of destruction. Spraying with lime sulphur solution in the dormant season will destroy many of the eggs. If any of them hatch, spray the trees early—as soon as the leaves are fully open—with arsenate of lead.

Gypsy and Brown-Tailed Moths

The female gypsy moth lays her eggs not only on the trees, but also on stones and rubbish. The nests are light brown in color, half an inch to one inch in length, and half an inch wide. In the fall or winter search carefully for the nests, and paint them with creosote. After the eggs have hatched, and while the caterpillar is very small, you can destroy them by spraying the trees thoroughly with arsenate of lead.

The nests of the brown-tailed moths are found on trees in curled-up leaves of a brown faded color. They should be gathered and burned in the winter. The arsenate of lead spray is effective, as in the case of the gypsy moth, after the eggs have hatched.

The Codling Moth, or Apple Worm

This is the flesh-colored worm that is found in wormy apples. The larvae in tightly spun cocoons are hidden in crevices of the rough bark, under rubbish on the ground, or in apple storage houses or cellars. In the early spring (by the middle of May) the moths lay their eggs on the young fruit or the leaves close by. The larvae begins to feed on the calyx end of the apple, and bores its way into the center. There are two or more broods annually. The most effective treatment is to spray the trees with arsenate of lead (three pounds of the paste to forty or fifty gallons of water) immediately after the blossoms fall, and again not less than ten days later.

The Aphid, or Plant Louse

You can see the eggs of this louse in winter on the twigs of young trees. The eggs, which are oval, shiny, and black, are deposited near buds on the stems, or in any crevice or rough place on the tree. In the early spring the eggs hatch, and the young lice by sucking the juice from the new leaves cause them to curl, to turn dark, and later to drop from the tree. To keep these insects down, spray the trees before the blossoms open, while the leaves are very small. At that time the lice are assembled on the tips of the buds, and can easily be controlled by using a spray made of nicotine sulphate, dissolved soap and water.

Apple Tree Borers

There are at least three varieties of borers—the flat-headed, the round-headed, and the twig borer; all of them are very injurious to young trees. The first two bore into the trunk very near the ground. Their presence in the tree is usually betrayed by little piles of brown sawdust near the base. When you find the burrow of the borer, either dig him out or kill him by inserting a wire in the hole.

But of course the best method is to prevent the borer from starting his ravages. Wire mosquito netting or tarred paper wrapped round the trunk of the tree, extending from at least one inch in the ground to eighteen inches above the ground, and tightly tied at the top with a soft string, will generally prevent the borer from making his attack. The twig borer works in the branches. Like the other two, he should be found and killed. Er courage woodpeckers to nest in your orchard; they are nature's way of getting rid of borers.

Rabbits and Mice

In the winter, mice and rabbits often eat the bark from the young trees near the ground. Light-mesh galvanized wire about one foot high, made into a loose collar and placed round the tree, will prevent destruction from these pests. You should always insert the wire at least two inches in the ground, and should tie it at the top to keep it from chafing the bark of the tree.

Spraying Outfits and Solutions

The home grower of fruits should of course have a sprayer. There are many kinds of simple inexpensive ones on the market. And it is a good plan, in order to be prepared to destroy the pests at the moment of their appearance, to have constantly on hand a supply of stock for making your sprays.

Commercial lime-sulphur solution, which can be purchased from dealers in any desired quantity, should be used in the proportion of one gallon to nine gallons of water. Spray it on the trees soon after adding the water, and remember to keep it stirred by some kind of agitator.

The prepared commercial oils for killing scales must be diluted gradually by adding cold water. Pour in the water, and stir it continually until you obtain a complete emulsion that is almost as white as milk. A safe and effective proportion is about one gallon of oil to fourteen gallons of water; so one quart of oil is enough for three and one-half gallons of water.

If you use whale-oil soap for summer treatment of scales, one pound will make seven gallons of spraying solution. Shave thin slices of the soap into a kettle, and add enough hot water to dissolve it. Keep the mixture on a hot stove, and stir it constantly until the soap is completely dissolved; then, if you used one pound of soap, add seven gallons of cold water. Stir the mixture thoroughly during the process, and keep it agitated while you are applying it to the trees.

You can make a kerosene emulsion that is good for controlling scales by dissolving two pounds of whale-oil soap in one gallon of boiling water, and then, while it is still boiling hot, but after you have taken it from the stove, adding two gallons of kerosene. Stir it rapidly until the mixture becomes cream-like in appearance. For a solution of suitable strength for summer use, add to this emulsion twenty-four gallons of cold water. Stir it thoroughly, and continue to stir it while you use it on the trees. If the emulsion is not properly made, and the oil rises to the top of the water, it will not be safe to use on foliage—it will burn and kill the leaves. It is better, however, to purchase a commercial oil spray, such as scalecide.

To make a spray of arsenate of lead for tent caterpillars, gypsy and brown-tailed moths, use one-quarter of a pound of the paste to three gallons of water. One pound, by the same proportion, should make twelve gallons of spray. first dissolve the arsenate of lead in a small quantity of cold water, have ready in your sprayer the amount of cold water that you are to use, add the dissolved arsenate, stir it thoroughly, and keep stirring it while you use it; otherwise you may burn your foliage.

Be sure to see the exhibit of the J. I. Case Threshing Machine Company at the Minneapolis Tractor Show, Jan. 31 to Feb. 7. Tractors and other Power Farming Equipment in Space H-2, Overland Building

Vermonters Show Fine Fruit

By B. M. Cummings, Vermont

Finer fruit was never displayed in Vermont than was shown at the annual exhibition of the Vermont Horticultural Society at Rutland. The large orchards are coming into bearing and with an attractive premium list and an unusually fine instructive program there was a large attendance and very competitive of the finest of orchard products grown in Vermont. The exhibition was staged in the Community House, gift of former Governor Meade, where on three sides of the hall was displayed plates, boxes, barrels and other compositions of most attractive apples..

The Rutland County Exhibit of R. R. MacRae was intended to show that this county has no rival even in the far famed Grand Isle county in Champlain Valley. There were extraordinary exhibits also from Belmont Farm Orchards in Addison County and two exceptional exhibits from E. H. West of Dorset and the "Orchards" at Bennington. The MacRae orchards displayed Northern Spies 4 inches in diameter and McIntosh Reds, only ¼ of an inch less than this with their red cheeks shined to a glass, opened the eyes of the uninitiated as to what may be done in central and western New York, and the visitors, many of them expert fruit growers, said they had never seen anything better even at the largest shows in the Northwestern United States.

Of special interest and wonder also, were the artistic displays of Delicious, Winter Banana, Baldwins, and Spies from other sections of the state.

The sweepstake prize for the best box was taken by E. H. West of Dorset on McIntosh Red. R. R. MacRae of the "Bonnie Braes" at Castleton took the $10 prize exhibit for the most beautiful and artistic display of apples on tables. The other $10 prizes offered by Governor P. W. Clement, were taken by E. H. West of Dorset for Northern Spy and Fameuse; by C. L. Witherell for the best box of Delicious, and "The Orchards" at Bennington for the best box of Grimes Golden. This latter blue-ribbon box was sent to Governor P. W. Clement in recognition of his contribution of the prize money.

The program was exceedingly instructive and pronounced by many as the best ever planned by the society. In speaking of farm laborers, especially for fruit farms, Professor F. C. Sears said that it was necessary first, to get good men; second, to furnish them with houses in which to live; third, to pay them well; fourth, to take care of them when they are sick; and fifth, get them interested in what they are doing. In speaking more at length about the farm labor problem, Mr. George W. Perry said that it was also desirable, where men had to make long days on the farm, that they have a long nooning, perhaps two hours, as compensation for early rising and late afternoon work.

Mr. William Darrow gave a very instructive paper on the Government inspection of fruit shipments and said the object was to provide a third impartial party to furnish evidence and judgment on what is right and whenever there are disputes between shippers and receivers.

The problems of the large orchards were dealt with exhaustively by Mr. R. R. MacRae of "Bonnie Braes" at Castleton who has 13,000 trees, by C. L. Witherell of Middlebury who has 5,000 trees, and by A. O. Ferguson, representing the Grand Isle Orchards Co. which has 10,000 trees. The discussion was closed by Mr. C. T. Ryan representing "The Orchards" at Bennington which now has 30,000 trees and which intends to have ultimately 100,000 trees as soon as they can be set out.

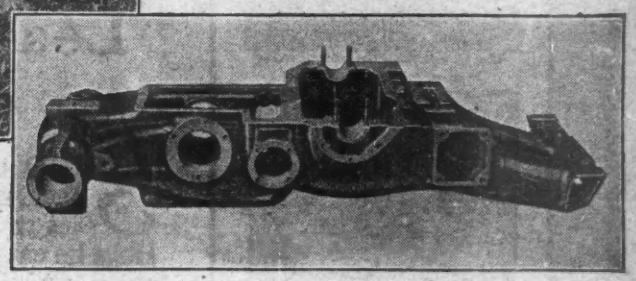
Why can't we all eat oranges every day of the year? If, as a California grower estimates, there are enough oranges raised in Redlands alone to girdle the earth at the equator, there must surely be enough raised elsewhere to go 365 times round the world's dinner table. If you have any idea of circling the globe, it might be well to chart your course by that orange belt.

Illustration shows Case 10-18 Kerosene Tractor pulling 2-bottom Grand Detour Plow.

Look for the EAGLE Our Trade Mark

To avoid confusion, the J. I. CASE THRESHING MACHINE COMPANY desires to have it known that it is not now and never has been interested in, or in any way connected or affiliated with, the J. I. Case Plow Works, or the Wallis Tractor Company, or the J. I. Case Plow Works Co.

Below: Showing the Main Frame of the CASE 10-18 Tractor, cast in a single piece. Holes for bearings on each side of frame are bored in one operation by a special machine of remarkable accuracy.



CASE-The Tractor with Strength that Backs its Power

One of the outstanding features of superiority of the Case 10-18 Tractor is the rugged strength of its construction.

Now, bear in mind the difference between *Strength* and *Power*.

When you think of the Tractor you have, or the Tractor you ought to have, you probably consider it in terms of power.

Right!—as far as it goes. The proper proportion of power to work is an absolute essential to economy and efficiency of Tractor operation. But tractor Strength, as embodied in the Case is the factor that stands between you and repair bills and the more serious losses due to breakage or delays.

For instance, the frame of the Case 10-18 Tractor is cast in a single piece. In this one casting are fitted the bearings for transmission, rear axle and motor. Obviously, bearings, shafting and gears cannot get out of line. Once in place, they are in correct alignment throughout the life of the tractor.

Other Features of the CASE 10-18 Kerosene Tractor

Four cylinder motor, mounted crosswise. Eliminates bevel gears, chain or worm drive.

Simple and accessible clutch, pulley mounted on crank shaft,—where it belongs. It is on the same side with the steering gears making it easy to line up with belt driven machinery.

Automatic control of motor temperature assures fuel economy.

Cut steel gears running in oil and dust-proof throughout.

Hyatt Roller Bearings.

Worm-driven fan with friction safety clutch.

Two speeds: 2¼ and 3½ miles per hour.

The Case 10-18 Tractor will most economically handle such work as operating a 2-bottom plow (as illustrated); 22 shoe grain drill; two 6 ft. binders; 8 ft. double-action disc harrow; the largest manure spreader; Case 20 x 28 thresher with feeder and wind stacker; feed mill, or any other machinery of similar power requirement. Write for booklet illustrating complete details of Case 10-18 construction. It will acquaint you with the special advantages of the Case 10-18 and enable you to judge all tractors with a new understanding. Free, on request,—a post card will bring it.

J. I. CASE THRESHING MACHINE COMPANY, Inc.

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Making Superior Farm Machinery since 1842

NOTE: We want the public to understand that our plows are NOT the Case plows made by the J. I. Case Plow Works Co.

CASE

KEROSENE TRACTORS

HAYES

50 Styles of Sprayers for All Purposes

The Hayes Wheelbarrow Sprayer is Ideal for Spraying Hogs

The Hayes Bucket Outfit Does Fine Work Disinfecting Poultry, Hogs and Outbuildings

The Hayes One-Man Boss Outfit Sprays Gardens quick, easy and cheap

Learn How to Rid Your Farm of Profit Stealing Pests

SEND the coupon on opposite page today. Get all these new spraying facts now. Don't stand idly by and let your Fruit wither and fall. Don't let your Potatoes and other Garden Products be ruined. Don't let your Hogs be eaten up alive. Don't let your Hens continue to be tormented so they can't lay. The trouble is they are infested with pests—millions of tiny UNSEEN, hidden pests—that are sapping their life blood; killing them; and eating up your profits. Learn now how to recognize and drive out these pests by spraying—the San Jose Scale, Codling Moth, Scab, Blotch, Bitter Rot, Lice, Mites—and the whole deadly, costly, disgusting lot of them. These pests cost farmers and fruit growers millions of dollars each year. Learn how you can save your share of this loss—and turn it into hundreds—even thousands—of dollars profit, by sending the coupon now for these startling new spraying facts.

There Is a Hayes Sprayer for Every Purpose

No matter what your spraying needs, from the great Hayes Triplex Fruit-Fog Power Sprayer to the smallest Garden Atomizer, you'll find it in the Hayes line.

There is a Hayes Sprayer for Orchards, Gardens, Field Crops, Vineyards, Nurseries, Cemeteries, Green Houses, Shade Trees, Potatoes, Cotton, Flowers, Alfalfa, Sugar Beets; Disinfecting Poultry and Hog Houses; Whitewashing; Cold Water Painting—and, in fact, every other known spraying job.

Hayes Sprayers for hand use have been designed for ease of operation, high pressure and enduring service. You get the best and quickest results with the least physical effort.

Send Coupon Today

Fill out and mail coupon on opposite page now. Tell us how many trees you want to spray and how old they average. Also other uses you have for your sprayer. We'll tell you where and how you can get the style of Hayes Sprayer best suited to your needs, and its price. We'll also send our Big New Book of Sprayers and Valuable New Spraying Guide FREE Send the coupon today.

"America's Foremost Spraying Apparatus" (38)

FRUIT-FOG SPRAYERS

Send Coupon for Wonderful Story of Fruit-Fog Spraying

GET all the facts. Learn why Fruit-Fog is now recognized the Nation Over as the most *thorough* of all sprays. Our Free Book explains why Fruit-Fog—the vaporous, high pressure, super-spray—is the ONLY spray that is fine enough to penetrate into the microscopic niches in bark, foliage and buds. It is the ONLY spray that reaches these hidden places where the millions of eggs and insects live that destroy fine fruit worth untold fortunes each year. No coarse, heavy ordinary low pressure spray can seek out and kill these *hidden* pests. Fruit-Fog positive thoroughness explains its amazing success. Its thoroughness will help you harvest a mighty yield this year. Send the coupon today.

With Famous Fairbanks-Morse "Z" Engine

Fruit Fog Spray is produced by the Hayes guaranteed 300-lb. high pressure and the scientific Hayes nozzle. This gives Fruit-Fog Spray a vapory *fineness* that has wonderful adhering power. No drops form—no solution wasted—no buds or leaves knocked off—as with coarse, heavy, low-pressure sprays. Hayes Fruit-Fog Sprayers are scientifically designed to give enduring service and greatest efficiency under high pressure. Skilled workmanship and positive standardization of every part, plus the famous Fairbanks-Morse "Z" Engine with which Fruit-Fog Sprayers are equipped, insure long years of satisfactory service to Hayes users.

Users of Hayes Power Sprayers are within only 24 hours of a service station at all times. In case of accident at a critical time this quick service may save your fruit crops. Hayes Power Sprayers, Engines and Repairs are distributed by

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Send the coupon for Big Book FREE, which pictures and describes the Fifty Styles of Hayes Sprayers. Also for our valuable FREE Spraying Guide. See why the deadly pests that infest your farm *cost you more* each season than several Hayes Spraying Outfits. Learn how to *stop these losses*. How to recognize and kill every pest. What solution to use—how to mix it—how and when to apply it. The Book and Guide are worth *hundreds of dollars* to any Farmer or Fruit Grower. In sending coupon please tell us how many trees you have and how old on the average. Also other uses for your sprayer. Send coupon today.

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HAYES Fruit-Fog Gun

Send coupon for FREE BOOK, and see why this is the world's fastest spraying apparatus. A simple twist gives long spray for tall trees, or wide spray for close-up work, or shuts off tight. Prevents waste of solution between trees. The only gun which combines great speed with the thoroughness of Fruit Fog. Enables one man to handle the capacity of big power sprayer. Get the book for full details.

Hayes Hand Barrel Spray Pump

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Hayes High Pressure Triplex Power Sprayer

HAYES PUMP & PLANTER CO.,
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Gentlemen:

Please send FREE and without obligation, your Big New Sprayer Book and your Valuable Spraying Guide

Number of trees.....

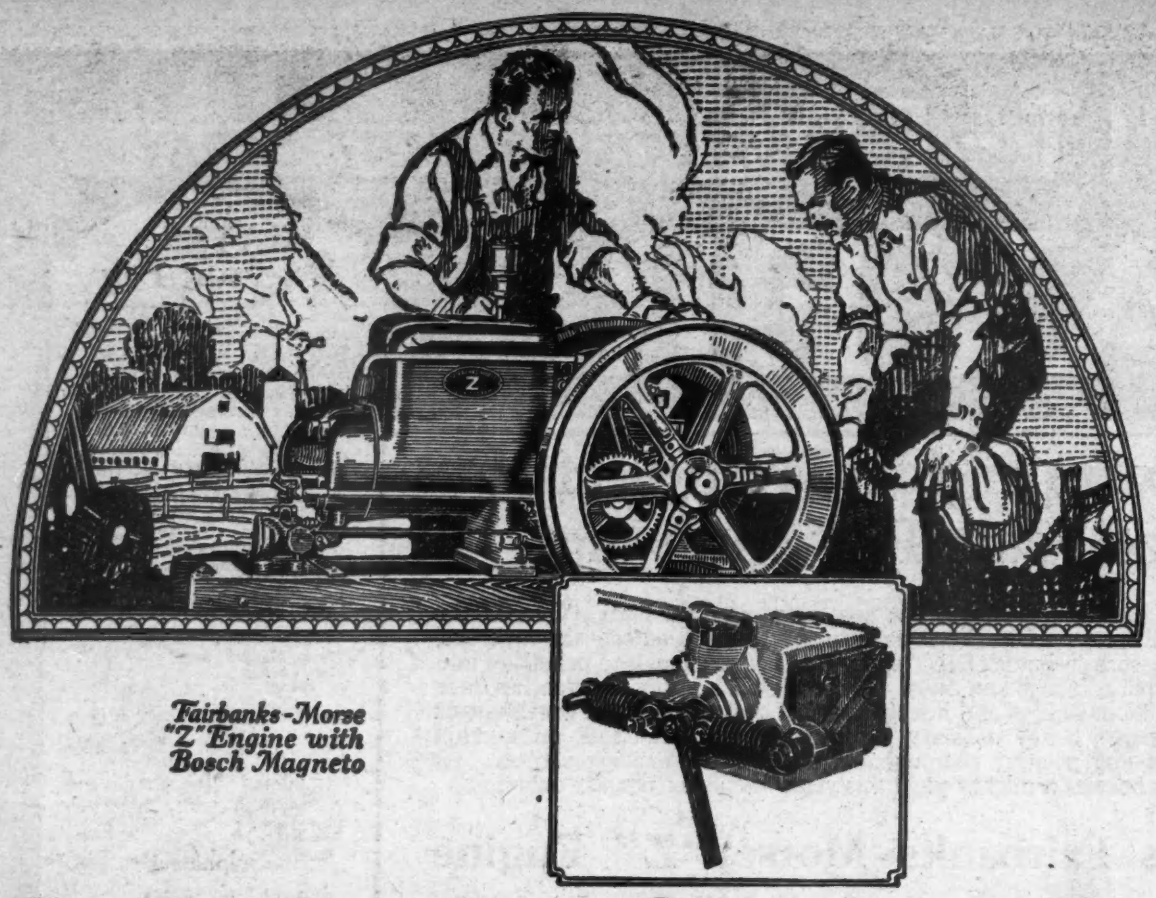
Average age.....

Other uses.....

Name.....

P. O.....

State..... R. F. D.....



Fairbanks-Morse "Z" Engine with Bosch Magneto

Farm Engine Supremacy

THE famous "Z" Engine and the Bosch high tension, oscillating magneto combine to make the one SUPREME farm engine. ¶ The dependability of the Bosch in delivering a steady succession of hot, intensive sparks is well known and adds the one possible betterment to the "Z"—always recognized as America's foremost farm engine. ¶ Call on your "Z" Engine dealer and see the result of this newest combination—FAIRBANKS-MORSE "Z" WITH BOSCH MAGNETO. ¶ Over 200 Bosch Service Stations assist our dealers in delivering maximum engine service. ¶ Prices—1½ H. P., $75.00—3 H. P., $125.00—6 H. P., $200.00—all F. O. B. Factory.

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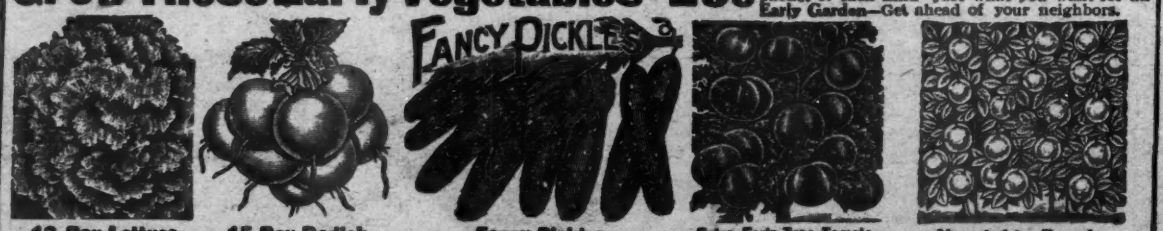
Grow These Early Vegetables—25c

Send 25c for these five varieties—one regular size packet of each kind—Just what you want for an Early Garden—Get ahead of your neighbors.



12 Day Lettuce is a beauty, ever any time, very tender and crisp, roomy head, very hardy, grandest of all lettuces.

15 Day Radish is a wonder for earliness, has produced radishes in 15 days from seed. Deep scarlet color, very crisp and tender.

Fancy Pickles is choicest strain cucumber in America for pickles, also good for slicing. Very early, producing great quantity of fruit and continue to bear all summer. Their beauty will surprise you.

Extra Early Tree Tomato grows strong and erect plants, producing great quantity, large handsome red fruits, very early, perfect beauty.

Vegetable Peach grows on vines, is an enormous yielder, fruit is about size of Peach, golden color, unequaled for preserves and pickles. Recipes for cooking, canning and preserving with packet.

This is the most profitable and interesting collection of High Grade Early Vegetable Seeds I have ever offered. Order today, entire lot 5 varieties, 1 regular size packet of each 25c or 5 Packets of each $1.00. 1920 Seed Book filled with High Grade Garden Seeds free with every order. F. B. MILLS, Seed Grower, Dept. 23 Rose Hill, N. Y.

Apple Pests to Watch For

By E. I. Farrington, Mass.

In some parts of the country the woolly apple aphis is coming to be a widespread pest, and one which the average orchardist does not know how to deal with. Various experiments have been made during the past two or three years, to determine the relative values of fall, spring and summer spraying. The concensus of opinion seems to be that summer spraying is most valuable. The exact time depends upon the locality. Professor Leroy Childs, of Oregon, says that in his locality the first of July is about the right time to spray. Wherever the farmer may live, the proper time to do the work is when the insects first become noticeable.

It is unfortunate that this work has to be done at a season when many other duties are pressing. It seems absolutely necessary, though, if this pest is to be checked promptly. As with all aphis, a contact spray is needed. Probably the best results can be obtained by using black leaf 40, with three pounds of soap added to each one hundred gallons. It is necessary to make a heavy application in order to reach all of the pests.

It is well, also, to add this tobacco preparation to the spray mixture used for the two broods of coddling moth. Two applications will usually serve to check the spread of the wooly aphis.

Red Bug in May and June

Another pest new in many sections is the red bug, another sucking insect like the plant louse. This pest works on the young apples in May and June, puncturing the skin and creating malformations, even if the fruit is not caused to fall. The pest is red in its younger stage, which accounts for its name. When small it looks like an aphis, but as it grows larger, resembles a squash bug, although, of course, it never becomes so large.

A tobacco preparation, preferably black leaf 40, is the remedy for this pest, as for the woolly aphis, as it must be killed by contact. A pint to a hundred gallons of water gives about the right strength, and the application can be made to advantage just before the blossoms open.

Another insect which is causing much damage in some sections, is better known, although new to many farmers. It is the leopard moth. This insect often confines its attention largely to shade trees, yet of late has been attacking apple trees, and doing great damage because of the rapidity with which the larva of the moth feeds. The borers work their way into the branches and limbs well up in the air, which makes them a little hard to locate.

The best remedy is to dig them out, and if work is begun promptly, serious damage will be checked. The leopard moth is a bad pest when it becomes established.

THE PURDUE APPLE SHOW

Undaunted by the unusual shortage in the fruit crop all over the country this year, the horticultural students of Purdue University at Lafayette, Indiana, are making plans for one of the best apple shows that has ever been held there. The purpose of the show, which is to stimulate more and better fruit production in Indiana, is a very worthy one, and the show deserves the hearty co-operation and support of all persons interested in fruit growing. Farmers' Week, January 12–16, has been named as the date of the show because at that time there will be in attendance at the university a very large number of farmers from over the state who are interested in all the modern agricultural methods taught at that school.

The apple show will be conducted similarly to the state apple show, and will include in its competitive exhibits a large number of plates of fruit grown by commercial fruit raisers, as well as many plates of apples to be exhibited by university and state high school students. A considerable number of valuable and desirable premiums will be awarded in the various classes.

Orchard Problems

(Continued from page 18)

dormant state without injury to the trees and with beneficial results. Scalecide is particularly valuable in the control of scale insects. The oil in this preparation gives it great spreading and penetrating properties. If directions are followed it will absolutely control scale insects. San Jose scale once was the bug-a-boo of the fruit industry, but practical fruit growers who spray carefully will tell you that it is very simple to control it. I have seen Scalecide used in orchards for many years, and have never seen any injury resulting, where directions were followed. That spray, as well as any other will injure trees if used carelessly, and if the directions are ignored. There are other brands of miscible oils on the market, but the only one with which I have had personal experience is Scalecide.

In regard to the ability of Scalecide to control blight, I have not had personal experience. However, I have talked with orchardists and some state horticulturists who seem to have very strong evidence that it heals the blight cankers on tree trunks and limbs, thereby eliminating the source of infection. It has been conclusively proven that the blighted twigs and blighted blossoms are infected from these blight cankers on the tree. Naturally, if the cankers can be healed up, that would control the twig and blossom blight, which are very bad on some varieties, such as the Yellow Transparent and Jonathan apples, and pear trees.

"Fire blight" as it is called, is one of the most serious of all orchard diseases, and if it can be controlled by spraying, the discovery will be of great value. Personally, I believe that this claim of blight control should be tested out by orchard men and experimenters throughout the country. It won't do any harm if properly applied, and if the claims are sustained in many different section s, it will be of far reaching importance. I had always believed that blight control by spraying was impossible, but in these days of advancing science, we must keep our minds open and ready to give a fair trial to anything that gives promise or indications of advancement.

I will not say that Scalecide will absolutely control fire blight of apples and pear. However, I will say that if I had a badly blighted orchard, I would certainly give Scalecide a chance to stop the blight.

GRAPE GROWERS TO ORGANIZE

On Tuesday, January 13th, 1920, at the Hollendon Hotel, Cleveland, Ohio, will be held the first regular congress of the National Grape Growers' Association to complete and ratify the work of the recent August convention's proposed constitution.

Representatives from every grape growers' association in the Nation are earnestly requested to be present in order that the constitution, when finally adopted and ratified, will meet with the approval of the congressmen in attendance, elect the permanent officers and outline the plans for the ensuing fiscal year.

The constitution adopted at the August convent on is merely a suggestion and is open to any change the congress may choose to make, so it is imperative that as large a representation of the Nation's grape growers be there that can possibly come. In order that this association may be truly national in scope it must be prepared by minds from all sections of the country welded into one homogenious act or plan, therefore every section should be represented.

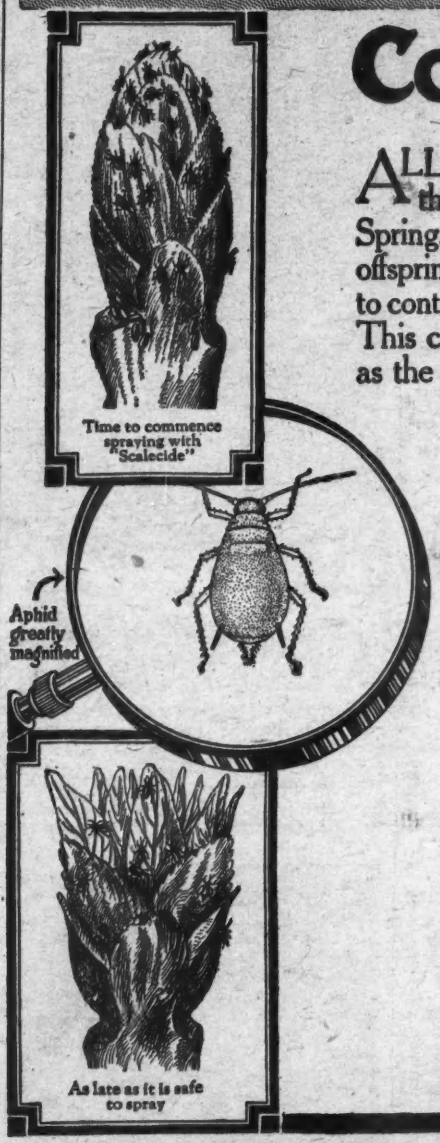
Come prepared to make this association all you believe the National Grape Growers' Association should be to adequately safeguard the interests of the grape growers of the United States. Growers now know the value of the local association and they are demanding the wider protection of a national one.

To say that this is a crucial time in the grape industry is but repeating the spoken and published sentiment of hundreds of well informed growers and the demand for a strong national organization to handle the larger affairs of the industry is growing stronger every day.—O. W. JOHNSON, Chairman Pro Tem., Geneva, O.

SCALECIDE

THE COMPLETE DORMANT SPRAY

"Makes a Tree Outgrow Its Troubles"



Controls Aphis Too

ALL FORMS of aphis, except the wooly aphis, pass the winter in the egg stage. These eggs hatch in early Spring. And since every aphid produces from 50 to 100 offspring, it is of the utmost importance to the fruit grower, to control the first brood in the Spring as they are hatching. This can best be done by spraying with "Scalecide" just as the buds show green.

Bulletin 184 of the Massachusetts Experiment Station shows on page 52 that "Scalecide" 1 to 15 is 100% efficient in killing aphids while hatching—and with only "slight injury" to the foliage when "¾ inch open," whereas lime sulphur 1 to 8 killed less than 10% of the aphids, and lime sulphur 1 to 8 with nicotine sulphate 1 to 800 added, altho effective, caused "considerable injury."

"Scalecide" used just as the buds are opening will also do effectively all that can be done by any dormant spray for *apples*. And the cost is less than for the combined spray of lime sulphur and nicotine sulphate. Besides, "Scalecide" goes twice as far, consequently it can be applied in one-half the time.

"Scalecide" controls scale, leaf roller, bud moth, case bearer, blight canker and collar rot, all at this spraying. It is a perfectly soluble oil (if not, don't use it). It penetrates the diseased bark, destroying the disease without the slightest injury to the delicate plant tissues—in fact, even invigorates them.

Write today for our guarantee and the name of our nearest dealer. Address Dept. 11

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Boys and Girls! This wonderful New Model Talking Machine, rosewood finish, nickel base, and popular record, is yours. A real Talking Machine with high-grade reproducer. Plays all size records up to 12 in. Given for selling only 20 large colored Pictures or 20 packages beautiful Post Cards at 10c each. Order choice today. Satisfaction guaranteed. GATES MFG. CO. DEPT. 937 CHICAGO

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New Ohio Beauty Apple

Trees from the Woodlawn Nurseries are vigorous growers and bred-to-bear. Our 44 years of successful growing experience has been devoted to the production of thrifty strong rooted stock. We have the exclusive sale of the wonderful Ohio Beauty Apple.

The same time-proven dependability makes Woodlawn grown shrubs, flowering bushes and perennials safe investments. The moderate prices bring an individual and attractive garden within the most moderate means.

Our illustrated 1920 Nursery List contains valuable planting and growing information as well as a catalog of select nursery stock. Mailed on request.

Our vegetable and flower-garden seeds make thrifty, beautiful gardens.

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Bigger crops mean more money

Proper and frequent cultivation are necessary to the production of maximum crops. Planet Jr. tools enable you to get increased yields because of their superior design, scientific construction. They do the work quicker, easier and more thoroughly. Planet Jrs. are guaranteed fully and last a lifetime.

No. 4 Planet Jr. Combined Hill and Drill Seeder, Wheel-Hoe, Cultivator and Plow sows all garden seeds (in hills or drills), plows, opens furrows and covers them, hoes and cultivates them all through the season. A hand machine that does the work so thoroughly, quickly and easily that it pays for itself in a single season.

No. 12 Planet Jr. Double and Single Wheel-Hoe has hoes that are wonderful weed killers. The plows open furrows, cover them and hill the growing crops. The cultivator teeth work deep or shallow. The leaf lifters save much time in late work when plants are large or leaves too low for ordinary work. Crops are straddled till 20 inches high, then the tool works between rows.

Planet Jr.

Free 72-page Catalog Shows tools doing actual farm and garden work and describes over 55 Planet Jrs. including Seeders, Wheel-Hoes, Horse-Hoes, Harrows, Orchard, Beet and Pivot-Wheel Riding Cultivators. *Write for it today.*

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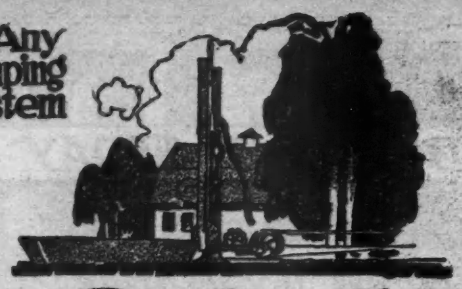

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HIGH TENSION MAGNETO

Power that is instantaneously ready—Power that is absolute in its dependability—Power that is enduring in its economy—is assured by the use of Bosch High Tension Magneto Ignition on a properly designed gas engine.

When Fairbanks-Morse Engineers conducted their extensive ignition investigation of 1919, they tried all ignition systems as compared with the world-famous Bosch Magneto. They exposed the Bosch High Tension Magneto to all kinds of weather—gave it far more severe tests than it could ever get under the hardest farm conditions, and then they had to agree that their newest and best engine, the famous "Z," should be Bosch magneto equipt.

The searching strain of farm work necessitates nothing less than Bosch High Tension Magneto Ignition—it is always efficient and dependable. For any piece of engine-driven farm machinery, insist on Bosch High Tension Magneto—America's Supreme Ignition System—you can get it.

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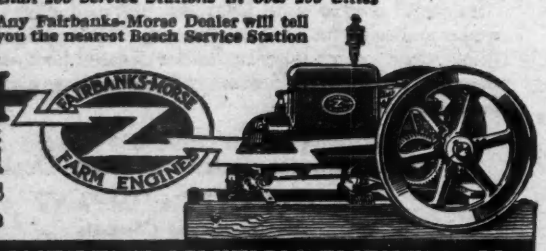
Any Fairbanks-Morse Dealer will tell you the nearest Bosch Service Station

It is the **BOSCH** Spark that gives real life to this farm engine



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RUST-RESISTING
Stock-proof Fences—made of Open Hearth Basic Steel wire, drawn and heavily galvanized in our own Mill. Kitselmans' long-lasting, Horse-High, Bull-Strong, Pig-Tight fences are

SOLD DIRECT FROM FACTORY TO FARM
We Pay the Freight and save you money on every rod. Don't fail to send for our big Free Catalog.

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MYERS POWER SPRAY GUN CAN BE USED SUCCESSFULLY WITH ANY POWER SPRAY PUMP

"BROAD OR LONG DISTANCE SPRAY" AS SIMPLE AS A-B-C TO ADJUST

You will appreciate the remarkable simplicity of the Myers Power Spray Gun — You will like its common-sense features that have made it so successful — You will be more than pleased with its easy adjustment (long distance or broad fanlike spray by one third turn of handle) — You will marvel at the uniform manner in which it discharges the spraying liquid and will appreciate its capacity range, (4, 6, 8 or 10 gallons) adapting it for use with any power spray pump — and, above all you will profit by the time, labor and material it saves during spraying operations.

Help is scarce — time is money. Here is the opportunity for relief — equip your Power Spray Outfit with a MYERS SPRAY GUN — the simplified one man spraying device. Your dealer will supply you or write us.

1920 Spray Catalog on request

F.E. MYERS & BRO. NO. 150 ORANGE ST. ASHLAND, OHIO.
ASHLAND PUMP AND HAY TOOL WORKS

The Spray Gun a Great Labor Saver

(*Continued from page 7*)

to the center of the tree and direct the spray downward as desired. For this reason quite probably the gun would be less effective than the spray rod in applying the calyx spray but this has not been entirely proved in orchard work. There may also be some danger that the excessive pressure of the gun may injure the tender leaves and flowers but this also lacks conclusive proof.

Spray from Bean Gun at Wide Angle Adjustment

Not all growers can use the gun to the same advantage. For the grower who desires absolutely 100 per cent efficiency and who is able to cover his orchard successfully with the slower pole and nozzle, probably, they will be more satisfactory than the gun. On the other hand the large commercial grower who cannot cover his orchard successfully with the pole and nozzle will probably find valuable use for the

Spray from Bean Gun at Long Distance Adjustment

gun because of the fact that it reduces the man labor about one half.

Usually slightly more material is used with a gun than w th a rod but this is largely a personal matter and the difference is less than is usually considered. It is not of sufficient importance to be a serious factor.

At the present stage in its development the spray gun is a valuable supplement to the spraying equipment but it should not entirely replace the old rod and nozzle for the calyx spray at least.

Seeking for a place where they may manufacture wine legally, the wine grape growers of California are making eyes at Mexican property. The Mexican government reports that 70,000 Americans are seeking new fields. The surprize we feel at the number of those who wish to shake from their feet the dust of the United States, diminishes when we learn that the large majority of these are of Portuguese extraction.

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Says One of Our Readers

One of our readers says, "'More Eggs increased my supply from three to 117 eggs." Any poultry raiser can easily double his profits by doubling the egg production of his hens. A scientific tonic has been discovered that revitalizes the flock and makes hens work all the time. The tonic is called "More Eggs." Give your hens a few cents' worth of "More Eggs" and you will be amazed and delighted with results. "More Eggs" tonic has done wonders for 400,000 chicken raisers all over the country. It will do the same for you.

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If you wish to try this great profit maker, simply write a postcard or letter to E. J. Reefer, the poultry expert, 3651 Reefer Bldg., Kansas City, Mo., and ask for his special free package $1.00 offer. Don't send any money. Mr. Reefer will send you two $1.00 packages of "More Eggs." You pay the postman upon delivery only $1.00, the price of just one package, the other package being free. The Million Dollar Merchants Bank of Kansas City, Mo., guarantees if you are not absolutely satisfied, your dollar will be returned on request. So there is no risk. Write today for this special *free* package offer.

Poultry Raisers Everywhere Tell Wonderful Results of "More Eggs"

More Eggs Is Wonderful
Reefer's "More Eggs" Tonic is wonderful. Before we used it we were getting one egg a day, after using it three weeks we got 12 eggs per day.
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Double Eggs In Canada
I am very much pleased with your "More Eggs" Tonic, as my hens have more than doubled their eggs.
MRS. ANDREW FALK,
Vanarsdol, B. C., Canada.

"Gets Winter Eggs"
It is the first time I got so many eggs in winter. When I began using "More Eggs" I was only getting from 1 to 3 eggs per day and now I am getting 11 to 13 eggs per day.
MRS. JULIA GOODEN, Wilburton, Kans.

"Plenty of Eggs Now"
I have been using Reefer's "More Eggs" Tonic for three weeks. When I started our hens were only averaging one egg a day out of 100 hens, and we are getting plenty of eggs now.
T. E. TATE, Armorel, Ark.

"More Eggs" a Godsend
I received your "More Eggs" Tonic and found it was a great Godsend. I was only getting 12 eggs a day, and now I am getting 50 per day.
MYRTLE ICE, Boston, Ky.

1200 Eggs from 29 Hens
The "More Eggs" Tonic did wonders for me. I had 29 hens when I got the tonic and was getting five or six eggs a day. April 1st I had over 1200 eggs. I never saw the equal.
EDW. MEKKER, Pontiac, Mich.

160 Hens—1500 Eggs
I have fed 2 boxes of "More Eggs" to my hens and I think they have broken the egg record. I have 160 White Leghorns and in exactly 21 days I got 125 dozen eggs.
MRS. H. M. PATTON, Waverly, Ills.

$200 Worth of Eggs from 44 Hens
I never used "More Eggs" Tonic until last December; then just used one $1.00 package and have sold over $200.00 worth of eggs from forty-four hens. "More Eggs" Tonic did it.
A. G. THODE, Sterling, Kans., R. No. 2, Box 67.

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Name.....

Address.....

.....

Make Your Spray Schedule

(Continued from page 22)

show on the trees, the oilcloth should be removed and the cocoons observed daily. The first emergence may be expected from ten to thirty days after the petals fall and the spray should be applied within a week after the moths emerge in numbers. If the moths continue to emerge for two or three weeks it will be better to apply another spray at once.

Put on the Bands

About this time place another set of bands so as to determine the date of application of the sprays for the later broods. All of the larva that collect under the bands have been produced by the first brood of moths. As soon as empty pupal cases have been found in these bands the spray should be applied and the fruit should be covered with poison as long as the empty pupal cases indicate that the moths are emerging in considerable numbers.

The further banding of the sprayed trees will also determine whether another spray should be applied or not. If the bands show but a few larva it may not pay to apply another spray. Whether it would prove profitable can be determined by multiplying the number of larva by 60 or the number of eggs each moth may lay.

It is believed that by noting the emergence of the moths and applying sprays that adhere well to the fruit that 90 per cent of the codling moth may be controlled.

Hoosier Apples Ribbon Winners

By Laurenze Greene, Indiana

INDIANA apples shown by the State Horticultural Society at the Mid-West Horticultural Exposition held at Des Moines, November 11th to 14th, took practically 75 per cent of the premiums offered on classes in which these apples were entered.

This showing is remarkable for two reasons. First, that they were shown in competition with apples from twelve other states. Perhaps more remarkable because they had been on exhibition for a week at Indianapolis prior to the time that they were shipped to Des Moines. This means that they had been subjected to high temperatures for a week prior to the time that they were shipped to Des Moines. It also means that they were packed and repacked twice as often as those of other exhibitors. Fruit men know that high temperatures soon cause apples to lose their bright appearance and firm condition. It speaks well for the Indiana apple that it was able to win such a high percentage of the premiums under these conditions.

Analyzing the entries and winnings of these apples is very interesting.

Ten barrels of apples entered in the barrel class took eight premiums and 75 per cent of the money offered in the classes entered. Ten boxes, each of Grimes and Winesaps from Indiana, took first and second premiums in the classes entered. This is 100 per cent of the money offered.

Eight single boxes of apples took seven premiums and 90 per cent of the money offered in the classes entered.

In the five bushel basket class the Indiana apples took 100 per cent of the money offered in classes entered.

In the ten tray class seven entries were made and took 81 per cent of the money offered in those classes. In the five tray exhibits eight entries were made and took 54 per cent of the premiums offered in those classes. In the five plate class 80 per cent of the money offered in the classes entered went to Indiana apples.

About the same percentage of premium money was taken in the single plate classes entered.

Of the sweepstakes half of the sweepstakes offered were taken by Indiana apples. Two-thirds of the premium money offered for sweepstakes was taken by Indiana apples.

Too much emphasis cannot be laid upon the importance of the influence of the Indiana Apple Show upon the kind of fruit grown in the state.

Another FEDERAL

A Federal three-tonner that is enabling the proprietor of the Sochelle Peach Ranch, North Yakima, Washington, to realize "profits on every peach."

FEDERAL

"Profit on Every Peach"—the Way They Do It On the Sochelle Ranche in Washington

Federal dependability is, of course, one of the big reasons why fruit growers like Federals so well, but when it comes right down to profits, you will hear them speak of *fruit* saved rather than *time* saved.

Fruit on the market is worth ten times the fruit awaiting adequate transportation to get it to the market—the one means profits lost—the other, profits made.

But, whether fruit growers speak of fruit saved or of time saved because of a Federal truck, the same basic fact is always involved, and that fact is Federal dependability.

The wide-awake fruit growers who own sturdy, reliable Federals are typified by the proprietor of the Sochelle Peach Ranch in North Yakima, Wash., who uses his Federal —a three-tonner—to ship 406 cases of peaches eight miles to the railroad. This Sochelle fruit grower tells us that he makes a "profit on every peach" due to fast transportation —by which he means his dependable Federal.

Fruit growers will find many interesting facts in a booklet entitled "Shorten the Miles to Market" and many valuable pointers, in a monthly publication "Traffic News," both of which we will send free on application.

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Preventive and curative of colds, roup, canker, swelled head, sore head, chicken pox, limber neck, sour crop, cholera, bowel trouble, etc. Mrs. T. A. Morley of Galien, Mich., says: "Have used Germosone 17 yrs. for chickens and could not get along without it." Geo. F. Vickerman, Rockdale, N. Y., says: "Have used Germosone 12 years; the best for bowel troubles I ever found." Frank Sluka, Chicago, Ill., writes: "I have lost but 1 pigeon and no chickens in the 5 yrs. I have been using Germosone." C. O. Petrain, Moline, Ill.: "I never had a sick chick all last season." Bernard Horning, Kirksville, Mo., says: "Cured my puniest chicks this spring." Ralph Wurst, Erie, Pa., says: "Not a case of white diarrhoea in 3 yrs. I raise over a thousand a year" Good also for rabbits, birds, pet stock.

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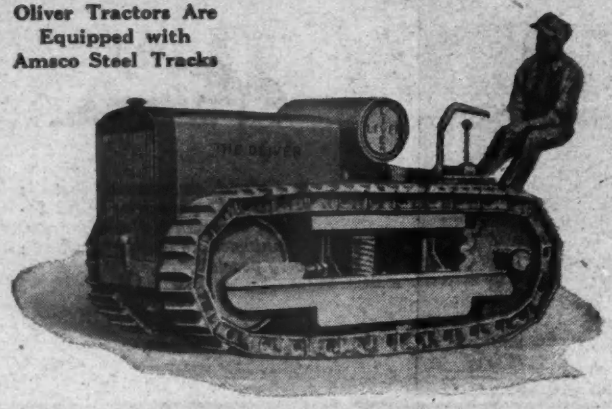

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With Our Lawyer

By Newton Jenkins

FRUIT growers are especially interested in shipping and the liability of common carriers arising out of shipments. A brief consideration of the subject might at this time prove interesting.

The general rule as to the common carrier's liability with reference to the goods in his possession as carrier, and regardless of any contractural exceptions is that he is liable for all loss or destruction of or injury to such goods. Proof of negligence is therefore immaterial and the carrier cannot escape liability by proving reasonable care and diligence. There is one important exception to the general rule holding common carriers responsible for loss to shipments, however, that is important to fruit growers. Railroads are not responsible for losses occasioned by what in law is known as an act of God, or the public enemy. While the public enemy, as regarded in the law affects enemies of the country with which the Government might be at war, and is not the occasion for many losses to shippers, yet an act of God includes such losses as are caused by lightning, storms, blizzards, intense cold or heat, etc. These circumstances frequently cause losses to shippers of fruit as well as live stock, etc. The loss in such cases is due to other than any human agency. Where loss is due to a collision or where a vessel strikes a hidden rock, the carrier is liable. The striking of the vessel against a rock not generally known to seamen might be construed as an act of God and the carrier held to be not liable for losses.

Where the common carrier has exercised reasonable care to protect fruit in transit and some unusual change in weather takes place such as a severe blizzard holding up the train and the fruit is frozen, then the carrier is freed of any liability. This does not, however, excuse the carrier from taking every reasonable precaution and exercising due care and diligence in saving such shipment, nor is the carrier responsible for the destruction of property occasioned by negligence of the owner. If the shipper is negligent or violates reasonable rules made by the carrier and brought to the attention of the owner then the carrier is not liable. Any fraudulent concealment by the shipper of the nature and value of the goods for the purpose of avoiding payment of charges for transportation will relieve the carrier from liability. If the goods are improperly packed and the railroad is not aware of the defect, then the road is not liable for loss arising from such defective packing.

Loss of the gooods due to improper direction of the destination of the goods excuses the railroad from liability. This does not excuse the railroad of course for destruction to the goods or any loss not due to such misdirection. In general the loading and unloading of goods is under the control of the carrier, and he is responsible for any losses that are occasioned during such loading or unloading.

The railroad company is not liable for decay of fruit in transportation where the fruit was of such a kind and in such a condition that the loss was the result of the operation of natural causes. Nor is the carrier liable where loss results from the fright of animals in transit where there is no negligence. In the transportation of mares with foal the carrier incurs no liability for loss by reason of their condition unless the company is chargeable with knowledge thereof, and he fails to exercise reasonable and necessary care.

But the carrier is not only ordinarily liable for losses occurring to goods in transit but the duty also rest upon him as far as possible to avoid or lessen the damage resulting from an act of God, and negligence in not doing so will render him liable. Thus if the carrier takes goods by a more hazardous route than that indicated by the shipper, he is guilty of negligence with reference to subsequent injury due to the more hazardous transportation If a delay is caused without fault of the carrier he is still liable for negligence in regard to the custody of the goods during such delay.

Railroad companies have been permitted by our courts to limit their liability to shippers by contract. As a result of this policy the carriers very specifically define the terms and conditions under which shipment is made and liability for losses is sustained. The attempt on the part of carriers, however, to limit their liability as against their own negligence or that of their servants has been unsuccessful. The railroads have been very persistent in these attempts as affecting the shipment of live stock but with no effect. Nor can the carrier relieve himself from liability by contract for damage to stock due to defective cars or applicances for loading and unloading.

It behooves every fruit grower to observe carefully every contract entered into concerning a shipment and take every precaution against losses arising out of the negligence of common carriers.

C. P. L., Clyde, New York, writes: What is the law with regards to loss occasioned by the decay of fruit while being transported by a railroad company? I made a shipment of berries last summer and the berries were rejected at the market. The railroad company refuses to settle stating that it was not the fault of the railroad.

Fruit decayed in transit without any fault of the carrier does not render the carrier liable where such fruit is inherently subject to decay. A delay in shipment, however, during which the fruit was allowed to spoil, or any other similar negligence by the railroad would render the company liable for the loss.

S. V. Greenup, Kentucky, writes: I shipped a hogshead of molasses which became a total loss when the hogshead burst as a result of fermentation. Am I entitled to recover damages from the railroad company?

Under the circumstances you would not be entitled to recover damages for your loss in this case. The loss was due to the operation of natural causes over which the railroad company had no control and the road would not be liable.

J. P., Rogersville, Tennessee, writes: A consignment of butter was shipped by me last summer during the hot weather and became a total loss due to such hot weather. The carrier refuses to pay for the loss stating that it was an act of God and that the company is not liable. The first road shipped the butter in a refrigerator car but the connecting carrier failed to do this and the loss was the result.

You are entitled to recover for the loss. The connecting carrier impliedly agreed to transport the butter safely and that company would be liable for its failure to put it in a refrigerator car.

M. R., Cadiz, Ohio, writes: Who is responsible for losses resulting in market changes where shipment was unduly delayed in the face of a falling market on fruit?

Any changes in the market taking place during normal period of transit would have to be stood by the shipper. Any losses due, however, to unreasonable delay by the carrier would be chargeable to the carrier as damages

N. O. R., Booneville, Missouri, writes: An agent of the railroad company turned a shipment of goods over to a man claiming the goods under an attachment. But there was no authority for such an attachment and there had been no tangible evidence of an attachment presented to the agent. Would the railroad be liable for the loss of the shipment in this case?

Under the circumstances set forth the railroad would be liable to damages. The road acted at its peril when the agent turned the goods over to a stranger after the consignment had been intrusted to its care.

It is becoming the custom of the country for farmers to make their homes attractive by maintaining well-kept lawns. Write to College of Agriculture, Ithaca, N. Y., for bulletin "Lawns and Lawn Making." It contains many helpful suggestions.

One of the show places near Visalia, Cal., is the 257 acre orange grove of Navels and Valencias owned by Chey Mock, a wealthy Chinaman.

Bringing Back the Old Orchard

By C. D. Platt, Iowa

"HOW can I bring my old orchard into bearing again?" is a question often asked. Before answering this question let us see why the old orchard is not already bearing. It will then be easier to suggest measures for its rejuvenation.

Failure to spray the trees has been one of the most common causes of unproductive orchards. Most of the trees are either so covered with scale that the vitality of the trees is weakened, or else they are so infested with worms and scab that if fruit ever did set, it would have a poor chance of developing.

Careless and ignorant pruning has also been the cause of failure of otherwise promising orchards. Many trees have split down under a heavy load of fruit because the bad crotches were not removed when the tree was young. Failure to prune at all has produced a "back to nature" condition in some orchards that is very much like a blackberry thicket.

Causes of Unproductiveness

The ambition to make two blades of grass grow where one grew before, is worthy of praise, but apples can not be expected to grow in a cornfield or where other crops are taking the plant food needed by the trees.

Whenever we see a tree making only an inch or two of growth a year, the foliage yellow and dropping early in the fall, the conclusion is at once reached that the orchard is being robbed of its proper nourishment.

The lack of drainage is another cause for unprofitable orchards. "Wet feet" are the forerunners of sickness and death, whether the subject is a tree or a human being.

What Trees to Save

Having summed up the most important of the causes for unproductive orchards, let us decide before putting a lot of money into the old orchard, whether it is worth rejuvenating. Following are the characteristics of a tree, which I would consider not worth rejuvenating and which had better be used for firewood. Carelessly pruned or rather butchered with an axe, never sprayed, never cultivated, never fertilized, 60 years old, lowest limbs twenty-five feet from the ground, infested with disease and dangerous insects.

On the other hand, if the tree has merely suffered from neglect and has not had the axe pruning, it may be brought back into production by careful management.

The first thing to do in rejuvenating the orchard is to thin out the trees where they stand too thick. I have found that the best method of doing this is to plot a map of the orchard showing the missing trees, the undesirable trees and the good trees. Then the thinning can be arranged so that the good trees will be left and the undesirables will be removed.

Prune in Winter

After taking out these trees, the remainder should be carefully pruned. This is best done in winter when the trees are dormant. The dead wood and all conflicting branches should be removed. This will usually be enough for the first year. The one important thing to remember is to make smooth cuts, and don't leave stubs as they do not heal over and decay and disease thus gain entrance to the tree.

After the tree is pruned the matter of spraying should be considered. If there is any scale on the trees a dormant spray will be necessary. Lime sulphur 1-8 is the best to use for this spray. Even if scale is not present, it is sometimes a good thing to apply this spray as it cleans up the moss and fungi that usually cling to neglected trees.

Two or more subsequent sprays should be applied. The time to apply these, and materials to use, can be obtained from any spray calendar. If there is apple blotch present it will probably be advisable to use bordeaux for the last spray as lime sulphur does not control the blotch to any extent.

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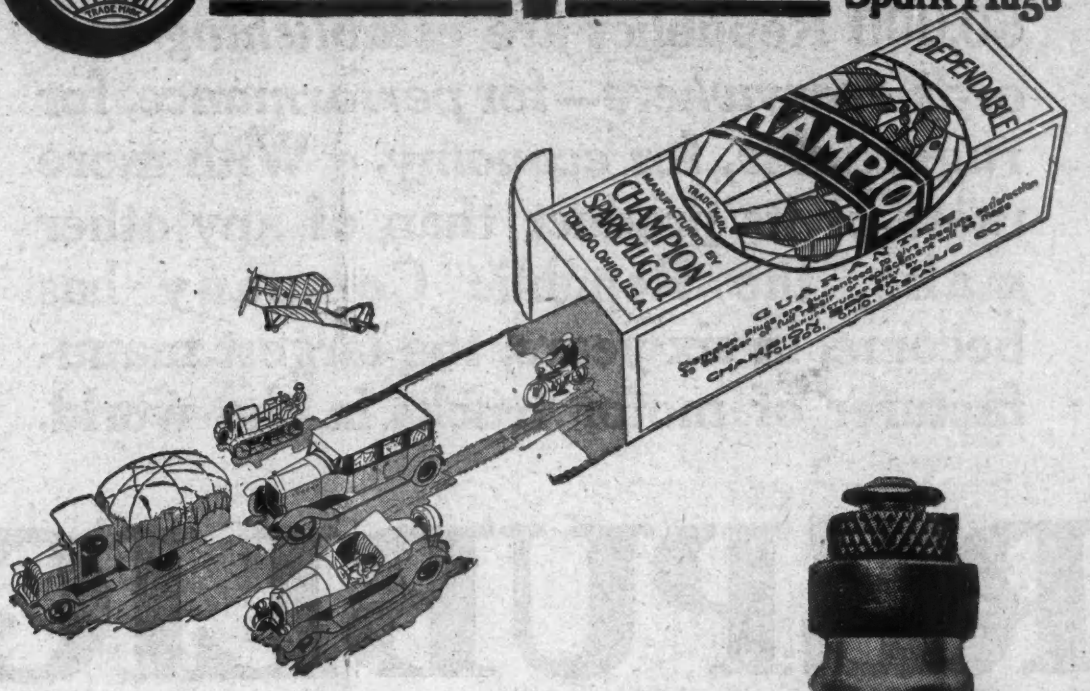

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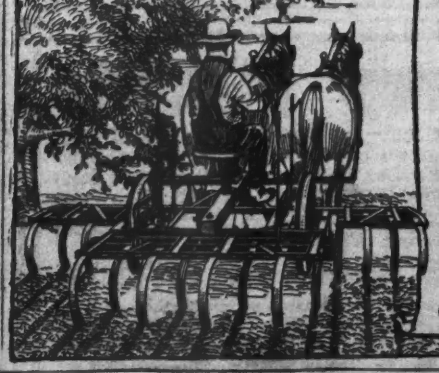

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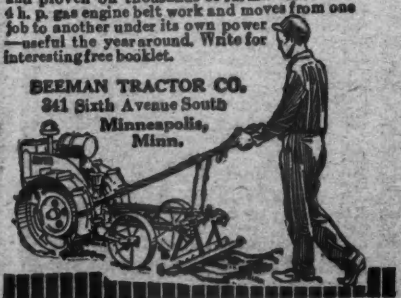

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A. R. WESTON & CO., R. D. 1, BRIDGMAN, MICHIGAN

Making Sand-Clay Roads

(*Continued from page 20*)

the top and harrow and drag it thoroughly.

5. Use coarse sand if possible as better results will be obtained.

6. Harrow it after a rain.

Second, for placing clay on the sand base,

1. Smooth the road leaving it flat.

2. Spread the clay the desired width and from four to six inches thick dependent upon tests previously made.

3. If the base is clean sand drag it up on the clay and plow, harrow, and drag both before and after rains.

4. If the sand base is quite loamy it will pay to haul more clean sand if possible.

5. Use a natural mixture of sand-clay in preference to clay providing it can be obtained.

The sand-clay road will give a smooth riding surface if properly planed. One good method of maintaining them to prevent their wearing too fast is to keep about ½ an inch of sand on their surface. This also has the effect of keeping down any dust that might arise.

There certainly is a big field open for this type of road in sand territories where clay is available and even more so in clay territories where sand or any form of grit is available. Even two inches of coarse sand on a heavy clay road will benefit it very much and will free such a road from slipperiness during all summer showers. Many communities having these clay roads will be well repaid if they sprinkle some sand on the surface.

FIGHTING THE CODLING MOTH

By Lewis Hillara, Kansas

The codling moth causes almost all the loss of apples by worminess. If we would understand the life history of this pest we could do a lot toward getting rid of it. While we neglect the simple means of preventing the maturing of adults we have a many fold greater job in ridding crops of apples from the young.

The last stages of this insect are not destructive ones, and thus we give them little attention during this period, and it is at this time that they are more at our mercy than ay any other. Of course we must spray for the codling moth larva, and we cannot hope to have good fruit otherwise—as yet. Probably conditions would have to change for the better very greatly before we could, but that does not mean that we could not help matters wonderfully by waging war on the maturing insects as well as the freshly hatched larva.

When the apples fall from the trees from codling moth larva ravages, the worm is right there in the apple. You know just where to find it, and you know that it will soon change into an adult, or rather pass into the pupa stage. The first crop of these will change into adult moths in midsummer, and these lay eggs to furnish the fall supply of worms and those which are to be carried over the winter to start the crop next year.

Why not cremate the worms when they fall and stop the process right there? Why not make pork of them if we have some hogs that will help us? Why not do something to insure that those worms will never become adult moths, to lay eggs for a second crop of worms in our fruit and to furnish adults for the next spring's work?

A large percentage of the adult larva in the pupal stage will be found in cocoons on the trunk and limbs of the trees, hiding in crevices or under anything that will protect them from the sharp eyes of the woodpeckers and other orchard birds. In the spring the adults come forth from these cocoons and deposit their eggs, not in the apples at all, but on leaves near the apple cluster which apples are about as large as peas.

You ask why spray when the petals drop, if the worms are not present then? It is because the worm will come to the apple and enter through the blossom end almost every time. If the spraying is done just after the petals fall the calyx is open, but it closes in a few days. If you get a dose of poison into the calyx before it closes, it is there for all the worms that come that way even until the apple is grown. Simple, isn't it?

Indiana Apple Show

By Thomas F. Riggs, Iowa

Indiana orchardists have been staging a successful apple show in Indianapolis for so long a time that it has become a fixed habit with them. This season it was distinctly an apple show. Every class was filled by leading commercial growers in common with many amateurs who have become orchardists by reason of the showings mad at the expositions formerly held by the Indiana Horticultural Society.

Here were shown some of the most perfect specimens of Grimes Golden, Jonathan, Delicious and Winesap apples ever kissed by God's sunshine. Indiana growers are partial to these varieties, their greatest love being for Grimes Golden, if the great enthusiasm and large showing of this variety can be taken as an index of the grower's feeling.

Prof. W. H. Alderman placed the award to the satisfaction of all exhibitors, a very difficult and painstaking task. The winners in the various classes were as follows:

Commercial Orchards

First, Robinson Bros; second, Clarence Bowers; third, H. M. Simpson; fourth, Coffin Bros.

One Hundred Trays

First, Coffin Bros.; second, H. M. Simpson.

Other Classes

Ten barrels—First, Coffin Bros., Grimes Golden; second,

One barrel—First. H. M Simpson Grimes Golden.

Ten trays—First, Coffin Bros., Jonathan.

Three baskets—First, 3 E. A. Doud, Winesap.

Single Box—First, Robinson Bros., Grimes Golden.

Single tray—First, Coffin Bros., Grimes Golden.

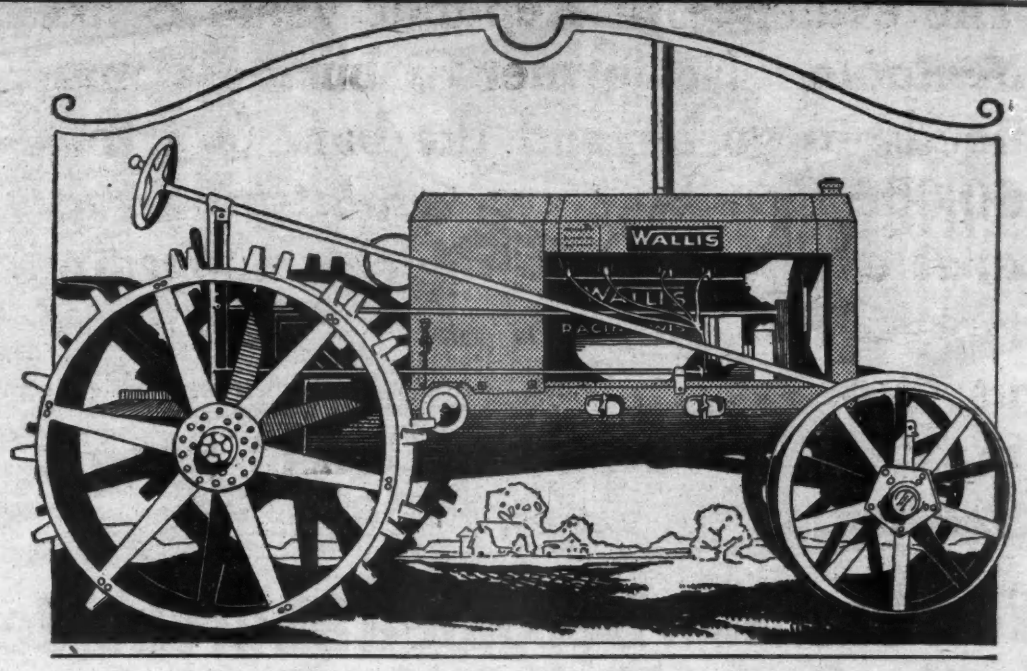
Educational Features

There were many educational features of merit, chief among these being a demonstration by the Home Economics department of Purdue University of the methods of preparation and preservation of the apple.

To me, one of the pleasing, and to my mind, one of the most important features of this show was the exhibit of articles the use of which will allow the fruit grower to save money on containers and thus enable them to place their crops on the market for less money. I was particularly interested in the exhibits made by J. D. Hollingshead Co., Chicago, and the Package Sales Corporation, South Bend, Ind. A. L. Poessel, representing the first named company showed a barrel-making outfit which attracted the attention and secured the endorsement of every commercial grower present. With this inexpensive outfit, a grower can make his own barrels, that is put the barrels together without the aid of a cooper. The barrels are shipped in knocked down, each bundle making one barrel. The barrels can be assembled by the grower at spare time, by buying in the knocked-down form, he says a great deal in freight can be saved, for the complete barrel is bulky, takes up room and the freight rates are high. Not only this, but the grower secures a better barrel by this new deal at a lower price.

Several exhibitors packed their apples in bushel baskets. Those which are faced presented a most beautiful appearance. The bushel basket is fast getting to be accepted carrier in certain lines of fruit and vegetable shipping. It is an attractive package. It is a comparatively cheap package. Fruit carries safely. It app als to the small buyer and to the dealer who, while selling thousands of bushels per year at retail must buy in small quantities. The bushel basket looks to me like a winner.

That bee growers may make money under proper conditions, is shown in the record of Roy Gilbert of the Tieton district of Yakima who received this year $2,600 from 150 stands of bees. It is reported that Gilbert obtained a hive of bees in 1910 while cutting wood in the hills; he brought it home and set it up in his yard, and from that one hive, he now has 150 stands.



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The Wallis owner knows the result. He has seen it in a sweet-running, powerful machine, which goes on day after day without faltering—a machine which serves him faithfully and teaches him the real meaning of tractor economy.

The Wallis owner knows that the rough work and terrific strains a tractor must overcome require even better engineering and materials, more careful and accurate workmanship than an automobile truck. And he knows that his Wallis serves him faithfully because it is built upon such standards.

Today there is only one tractor of Wallis quality—and that is the Wallis. It represents a class entirely its own—a class extending back for 12 years when Wallis first proved that in quality—not bulk—is the only real tractor strength obtained.

More and more men each day are finding in this quality machine the answer to their question "What Tractor?" The demand is heavy right now. This very day is the time to investigate, if you want a Wallis.

See the local dealer or write us.

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This illustration is an exact copy from Bulletin No. 168 of the Oregon Agricultural Experiment Station showing difference in yield of two plots of ground of equal size. Picture No. 1 shows alkalie yield where soil was not treated. Picture No. 2 shows yield where Gypsum was applied. (1)

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For more than 40 years "ACME" Tillage Tools have helped to make the American farmer the world's most efficient producer of food stuffs. The best features in standard disc harrow construction have now been combined with exclusive new features in the

"Acme" Disc Harrow

The discs are so shaped as to enter the ground with a clean cut. The direct thrust of the axles is taken up on dust guarded ball bearings instead of cast bumpers. These features make the draft light. Offset gangs do away with the middle ridge so objectionable to the careful farmer. The gangs can be set independently—the driver can hold the tool to its work on steep hillsides. Pressure springs make the discs "bite in" and prevent skipping of low spots.

Order early so as to secure a full season's use. Write today for circular and prices.

"Acme" *Disc* Harrow: Fore trucks, tongue or a combination of both as desired. 8 sizes, using two, three or four horses.

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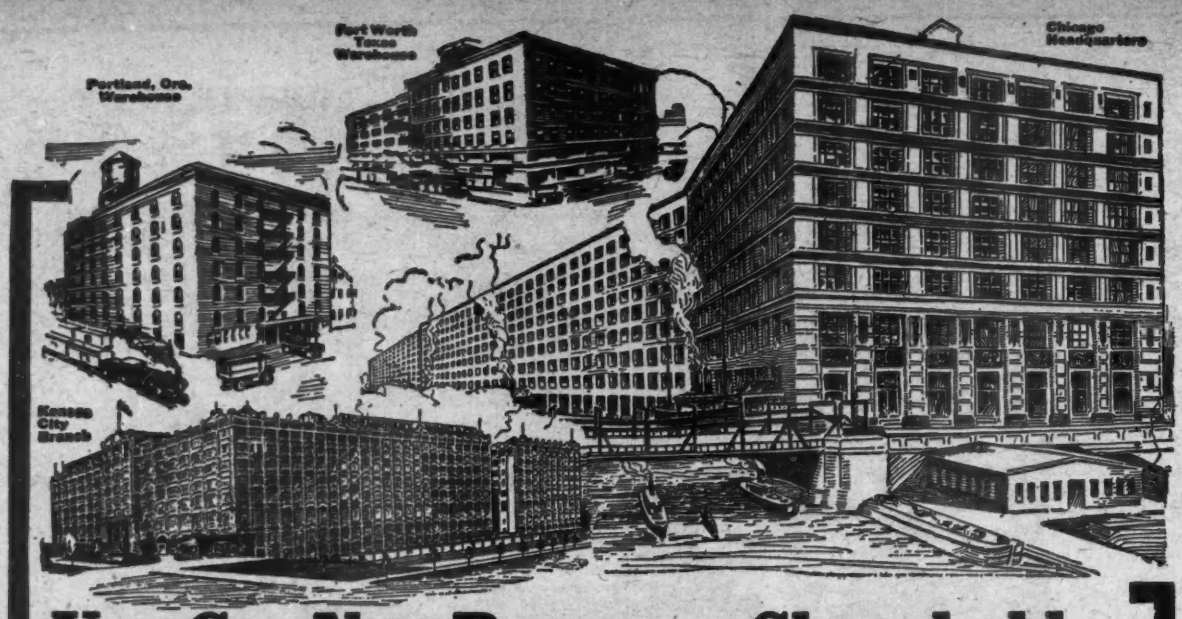

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In the past the sales and profits of Montgomery Ward & Co., have doubled every few years and those who have held shares in the company have profited handsomely. On account of the great prosperity of the farmer and the country in general, the addition of other very able merchants to its board, and the large amount of additional working capital recently added to its treasury, it is reasonable to expect that the gross sales and profits of Montgomery Ward & Co. will multiply even more rapidly than in the past.

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Realizing the need of conservatism at this time of great business prosperity and of wide, popular demand for investment propositions, we believe we can lay before you, who know so well the reputation of this great mail order concern, this issue of Montgomery Ward & Co.'s Common Stock, emphasizing its desirability and permanent soundness.

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EXECUTIVE OFFICES
Montgomery Ward & Co.
Robert J. Thorne, Pres.

Chicago, Jan. 4th, 1919

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Yours very truly,
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Orchards of Galled Trees Not Lasting

By J. M. Van Houten, Iowa

IF YOU were building a house to live in for forty years, would you build it of plaster or bricks? Would you situate it in the valley near the floods, or on the proverbial rock, high and dry?

In a similar way, if you were planting out an orchard, would you plant one comparable to the plaster, that would stand up only a few years, or would you make one like the brick, to last for a long time?

Crown gall has been known for a long time but its injury to apple trees has not been known for long and what is known now is still more or less vague. Back in 1910, at the convention of the National Nurserymen's Association held in Denve , members of that body became agitated in regards to the amount of damage caused by this growth and appointed a ommittee for investigational purposes. Mr. E. S. Welch, president of the Mount Arbor Nurseries of Shenandoah, Ia., happened to be a member of this committee.

In the spring of 1912, the first planting, consisting of 310 trees affected with crown gall and 246 normal trees, was made. There were two varieties, Jonathan and Wealthy, there finally being 200 of the latter infested and 210 of the former, their totals being 326 and 330 respectively.

It seems strange that crown gall infected apple trees show more life than those that were supposed to be healthy, but such was true, for at the end of five years, more of the infected trees were alive than the normal ones. However, conclusions cannot satisfactorily be drawn from this, for in the severe winter of 1916–1917, the stand of infected trees was reduced to 91 per cent while 95 per cent of those trees in the healthy block were still standing. Perhaps the more satisfactory conclusion might be drawn from the latter fact.

Different varieties of apples have been known to vary in susceptibility to disease. The same is true of crown gall. While the experiment itself established conclusively the fact that Wealthy is more susceptible than Jonathan, it has been generally recognized that hardier varieties are more seriously affected with crown gall. Take such varieties as the Patten Greening, Brilliant, Okabena, Eastman, Anisim, Wolf River, Tolman, Sops of Wine, the Ben Davis group, Winesap and Jonathan and Wealthy as well, are known to be particularly susceptible to crown gall. Other varieties as Duchess of Oldenberg or Hibernal are seldom infected with the disease. The various varieties of crabs are heavily struck.

The fact that Wealthy is more susceptible than Jonathan was borne out by infections. Soil on which the experiment had been carried on had had infected trees in before, so that the bacteria which spread the disease were present in the soil. Some trees of each variety, free from infection, were planted, and investigation showed that 62 per cent of the Wealthy became infected while only 12 per cent of the Jonathan succumbed.

Trees can recover from crown gall, but of course are stunted from being held back by the disease. From those trees that were infected when planted, it was found that 81 per cent of the Wealthy had thrown off the disease in five years, while 31 per cent of the Jonathan had recovered. This goes further to prove the greater hardiness of the latter variety.

Effects of Gall

Galls were found to be of two varieties, the hard gall and the soft gall. The hard gall is woody, and seems more like a dead body, as if the gall were dead or lying dormant, while the soft gall or hairy root, is a more lively body and seems to be more actively growing. Perhaps the fact that of the infected Jonathans that recovered, 36 per cent of the Jonathans were of the hard galls and only 29 per cent of the soft, may indicate a more active growth in case of the soft galls.

This hairy root, a form of soft gall, is peculiar. When a tree is planted out, it seems to make a good growth, due to the large number of sap roots which are put out from the gall. However, if the gall is located in a position as to directly interfere with the flow of sap, it will later stunt the tree.

Galls act on trees by interfering with sap flow. In this manner, a gall on the main root is more serious and more of a detriment than one on some side roots or secondary feeders. When the sap flow is cut off, the tree is stunted as was shown in the experiment by reduction in twig growth and growth of trunk diameter.

Effect of Crown Gall

Our grandfathers used to girdle or partially cut off the sap flow of the trees to throw them into fruitfulness. Crown gall does the same in a modified way, thus throwing the infected trees into fruitfulness early. This was shown by the fact that in five years, those trees which were known to have been infected, showed blossoms and fruit spurs while normal trees were still making their younger growth.

Galls that were formed on stock and union seemed to be equally harmful, being both on main feeding portions of the tree. Galls on secondary roots naturally seemed to be less harmful than those on main roots.

The experiment as carried on at Shenandoah, of course has not had time to run to trees of bearing age, but does cover that kind of stock which would be planted out by the orchardist as grown by the nurseryman. Crown gall is dangerous. It is quarantined from interstate shipment in many of our states. In the vicinity of Shenandoah alone, where there are two nurseries, the loss in a bad year is often as high as $40,000 or $50,000. The annual loss in nurseries in the middle west is 20 per cent to 50 per cent of the total production, as all galled trees are a total loss.

A complete summary of this experiment to date can be obtained by sending for Research Bulletin No. 50, Iowa State College Bulletin Section, Ames, Ia. The bulletin was written by Laurenze Greene and I. E. Melhus.

Fertilizing Fruit Trees in Ohio

By U. T. Cox, Ohio

ABOUT a dozen years ago the Ohio Agricultural Experiment Station cast about to make some tests in fertilizing orchards and when they got ready with their plans and material the tests were made in Washington and Athens counties and the summer meeting of the Ohio State Horticultural Society was held in one of the test orchards and many orchardists from far and near attended that meeting to view the results. Several growers went from Lawrence County and were firmly convinced that some such application was needed in their own orchards and as we had a local co-operative association we got together after harvest and planned to fertilize, although some waited to see other results before venturing into the game.

The first tests were made with 5 pounds nitrate of soda and 5 pounds acid phosphate per tree, as such quantities gave the best results in the state tests. The cost then was about 25 cents per tree and their results were from $3 to $5 per tree, net, with apples selling at $3 per barrel. They first made the application just after blooming, but we soon got to making it just before the bloom, and found it caused the fruit to set that year instead of having to wait a year as the first test showed when applied after bloom.

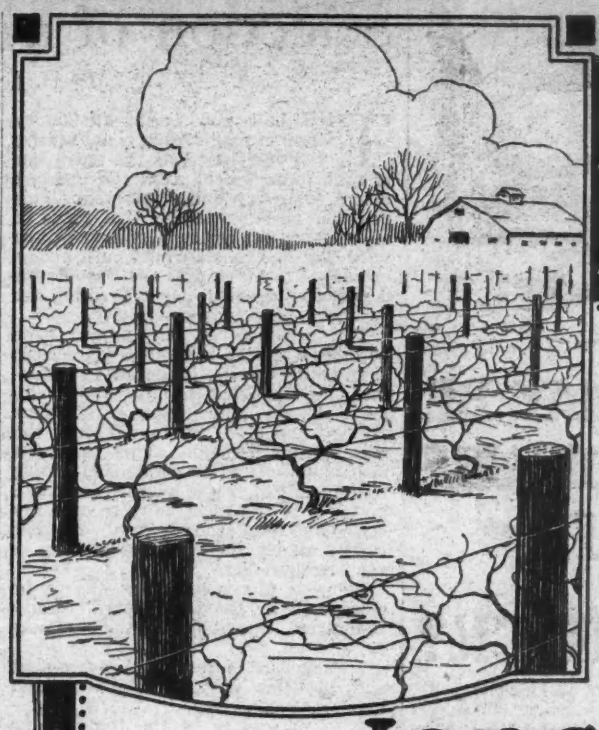
Fertilizing Paid in Sod Orchard

In every case to my knowledge the fertilizing has paid big dividends when properly applied. Practically all our growers use nitrates now and most of them acid phosphate too. Dynamite was boomed as a great panacea when we first began to fertilize but in our tests with three rows dynamited through an orchard in comparison to nitrate we could see no results from the dynamite whatever, but the nitrate was so convincing that we never think of leaving any more trees without it.

The orchards here are all in grass, or some of them rather in weeds, and the fertilizer is sown by hand on the sod and the rain washes it in the soil. At first the nitrate of soda was mixed with the acid phosphate and sown together but now many sow them separate. It seems that the acid phosphate should be sown over all the ground but the nitrate just around the trees and out farther than the spread of the branches. It has given good results when sown as early as the buds start to swell and acid phosphate can be sown any time of the year but nitrate will dissolve and wash away if not applied when growth is taking place.

The grass around the trees shows in its dark green growth and so much higher, that nitrate gives results in growth. In about two weeks after the application the foliage turns green and thrifty on the trees showing the good start it is taking. If the bloom is all right the fruit sets and grows well if other conditions are favorable, such as spraying and weather without frost. We never fear cold east winds any more since fertilizing the orchards, and thrifty trees will stand more freezing and set a better crop of fruit than those not fertilized.

The apple industry has taken on a new lease of life since fertilizing came into use and many new orchards have been planted and the price of those in bearing has gone sky high it seems since the big prices of the last two years. In 1918 this county had about 300,000 barrels of apples which sold for nearly a million and a half dollars and nearly all of them were Rome Beauty. In 1919 on account of the very heavy crop the year before with no labor at hand to properly thin the fruit on account of the frost the tree set a very light bloom. To summarize we get more and better fruit, larger and likely better color where acid phosphate is used and the trees mature the wood better and have better foliage. The trees have longer life and more regular bearers. Better grasses come into the orchards and the mass of growth and roots make more humus and leaves the soil better texture. Drouth will cause less injury, and the grower will look better of his work and life, and have a better family.



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Of uniform size. Sizes No. 1 Round 2½ to 3⅝ inches top diameter; No. 2 Round 3½ to 4¼ inches top diameter; No. 3 Round 4⅛ to 5¼ inches top diameter; No. 4 Round 5⅛ to 6¼ inches top diameter; No. 3A Sawed Halves made from posts having 4½ to 5¼ inches top diameter; No. 4A Sawed Halves made from posts having 5⅛ to 6¼ inches top diameter. Lengths 6, 6½, 7 and 8 feet. Also sawed quarters from posts having 6⅛ to 7¾ inches top diameter, length 6½ feet, and 8 to 9½ inches top diameter, length 7 feet. For end posts, 8 to 10 inches top diameter, length 10 feet.

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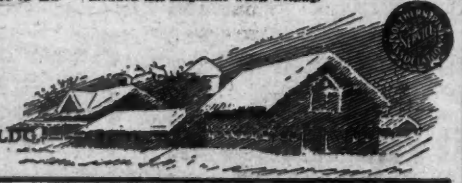

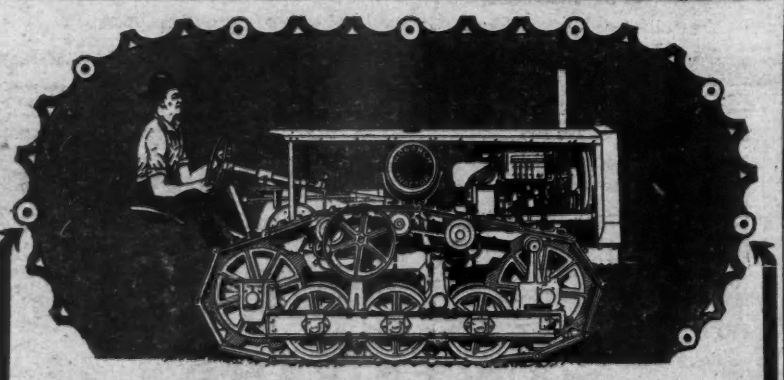

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Selection of a Type of Road

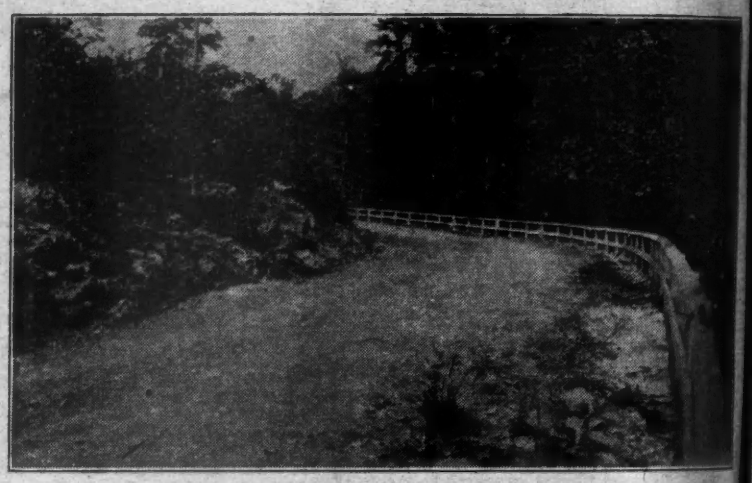
By H. J. Kuelling

THE best and most satisfactory form of road surface is not always the one that costs the most, but is that form which gives the greatest return for every dollar invested. This principle therefore means that roads of all types are and will for all time continue to be built. This statement must not be construed to mean that the wrong type is not often selected, nor as favoring one type for a particular community.

The selection of the proper type becomes a matter to be investigated just as any other possible investment. Necessarily it follows that the larger the investment and the more permanent the type selected the more carefully should the investigation be made. Thus the roads near a large city or the main roads leading from one small city to another demand a better type and must be more carefully considered than a purely rural road that carries merely the traffic originating in the neighborhood.

Some of the points that should be considered by the town board, county committee, or engineer, as the case may be, are:

1. Valuation of the unit of government and probable cost of the work and maintenance.
2. Topography of the route to be improved and the nature of the soil.



A Well Protected Blind Corner—The White Guard Rail is Easily Visible at Night

3. Amount and nature of present and possible future traffic.
4. Local material available and local conditions.
5. An inspection of similar roads that have been improved for some time.
6. A financial study to arrive as closely as possible at the ratio of total cost to total tonnage.

Any or all of these may be of little importance or may be of vital importance depending upon local conditions.

(1) Valuation and Cost

Necessarily the types of road whose initial cost is high must sometimes be eliminated from consideration because the money is not and cannot be made available. This means one of two things—either building no road or building one that will ultimately have a higher unit cost per ton of traffic.

On the other hand there is occasionally a case where plenty of money is available for a better type than is needed, but such a condition is rare.

It is sometimes desirable to build no road at all for a year or two and wait until more money is available, rather than build a type that might prove a failure under increased traffic brought on by the improvement.

(2) Topography and Soil

These two subjects should be given some consideration whether the road is a main artery or a third class highway. Where the route is very hilly and cannot be relocated, the slipperiness of the available types must be considered. In case the route is through flat land, slipperiness is not so important and the question of possible frost action quite important.

Where the road passes through a changing topography it is often desirable to vary the type of construction due to grades encountered, to possible overflowing of lowlands, or to poor under drainage.

(3) Local Materials and Conditions

Other things being equal, the type of surface that uses the largest percentage of local material is to be preferred. In other words, the more of the money that can be retained at home, the better the local business conditions. This is true whether the labor is used in the actual construction of the road or in the manufacture of some material entering into it.

On the other hand, quality in the highway must not be sacrificed merely to patronize home industry. Sometimes by a proper selection of a road type one layer may be built of a somewhat poorer local material and the surface of a better quality of material from some outside source.

Local conditions relative to the road should also be considered, such as the products to be marketed. For instance, a community may have some particular industry, as mining, specialized farming, as fruit, cabbage, tobacco, etc., that demand marketing at a certain period or under certain weather conditions. If the marketing of these products is to be done over the road in question some different kind of road may be required than would be in another section of the community.

(4) Amount of Traffic

This is a point that is given little attention especially by the laymen. Present traffic can be easily determined by actually counting it on various days and dividing it into classes and kinds. This will have a bearing on the type and design of the road. Swiftly moving power driven vehicles demand greater width and easier curves but can be propelled on steeper grades than horse drawn vehicles. Even pedestrians should be considered on many important roads.

In considering traffic, the official must give careful attention to possible future traffic, especially trucking by power, a kind that is now only in its infancy. It is only a few years before any farmer of importance will have one or more trucks to do his marketing, to say nothing of the thousands that will do inter-city haulings.

(5) Inspection of Similar Roads

With some knowledge of their own conditions as outlined above, it is often advisable for officials to either have someone, or themselves, inspect roads in a community situated somewhat similarly to their own.

In making such an inspection they should not only find out the specifications, cost, and age of the work, but more important, the amount and nature of traffic it has carried. They should find out, if possible, the amount of money spent in maintaining, the quality of material that went into the roads, and the soil and drainage conditions.

(6) Financial Study

After all, the final decision as to type should be determined by the estimated final cost per ton of traffic. In arriving at this final cost, the official should consider the first cost of the pavement, interest on that cost, and maintenance

Preparing for Orchard Planting

By Lewis Hillara, Kansas

AN ORCHARD is to occupy ground for many years and if we do not put the soil into the right condition before we plant it we have no chance to do it afterward. Good preparation cannot be made in a hurry, and unless the ground is already in good shape generally it cannot well be done the same season the trees are to be set. That is it ought not to be, for it cannot be so well done.

Several years ago I saw a nice field planted to fruit by a man who was an expert, having been a nurseryman. The first thing he did was to hire that ground covered with a heavy coat of manure and have it disked in. Then he had the man put double power to his big plow and put it down as near a foot as he could. After planting the ground to a cultivated crop that season it was ready for the final preparation for the tree planting. That soil was deep and no hardpan near the surface, and the trees took hold at once and made exceptionally fine growth right from the start.

Soils cannot all be made deeply fertile in this way, for some of them have a subsoil that is impervious to water. If this impervious subsoil will shatter by blasting instead of packing, this is the best way to treat it, but if not and it is within three feet of the surface I would not advise planting trees there at all. A good orchard must have a fairly deep soil. Very heavy clay soils can be lightened by a free use of lime and humus. Lime will work wonders with clay if it can be worked down into it and the clay broken up. It prevents the clay running together again. Humus improves any soil.

Digging the holes for trees several months before planting will help to loosen up the soil surrounding the hole, for the action of the water and air is beneficial. I have known good results to follow filling the holes with fresh manure from the horse stable and tamping it so it will heat. A little soil thrown over the manure saves the ammonia and the covering soil is made so loose and friable that it is ideal for placing around the roots. The manure is spread around the tree at a little distance away from it after it is taken from the holes and the trees planted.

Plowing the ground before the trees are set, if it has been well prepared, is not necessary, in fact I do not think it advisable. Tree roots prefer a fairly firm soil to a loose one. Disking just before planting is all that is needed. A demonstrator from an agricultural college showed a farmer I knew how to plant his trees, and he did not have the ground plowed, as it was in good condition, but he advised disking only.

Finding Time to Spray

By N. D. Peacock, Indiana

During the past few years the farm orchards in Indiana have been more and more neglected and as a result have very rapidly depreciated in value. This lack of care has in a large part been due to the fact that the farmers did not find time to give to a small orchard. Spraying is absolutely necessary now if fruit of any value is to be produced. This has been recognized by the farmer to a large extent and as a result he has surrendered to the many insect pests.

This important operation comes at a time when the farmer is exceedingly busy with his spring work and unlike most farm operations there as a comparatively short time during which the spraying must be done. For example corn planting can be delayed a week with no serious effects, but if the calyx spray is delayed two or three days too long it is of very little value, in like manner if the scab spray is delayed until after severe infection it is not effective. For these reasons if a farmer intends to give his orchard any care it is necessary that he take time to apply, at least the calyx spray, when the time comes.

Any farmer who so desires can find time to apply the dormant spray during the winter when work is not rushing. It is the summer sprays which come at a busy time but let us see if it is impossible to work them in with the usual farm work. The first summer spray, applied when the buds begin to burst, usually comes about the middle to the last of April. The second summer spray applied after the petals fall but before the calyx closes usually comes about the last of April or the first of May. These two sprays will come after oat planting so time would have to be taken from preparing the corn ground. The third spray applied three or four weeks after the petals fall usually comes about the last of May or first of June. This would be after corn planting so farm work would not be so rushed as to make a day's delay important.

Takes Time for Spraying

There are a few ways in which this spring rush can be relieved so as to make room for spraying the farm orchard. In the first place fall plowing where possible will relieve the spring work at the time spraying should be done. Also the use of larger and more efficient machinery will enable many farmers to find the necessary time. The time required to spray the average farm orchard of about 50 trees is not great. With a barrel outfit it would probably take less than half a day. In a community where several farmers have small orchards which they wish to spray, they may co-operate and buy a good power outfit which will enable them to do better work, in a great deal less time and at a lower final expense. Usually, in fact almost always, there is sufficient time in the spring when the ground is too wet to work to spray the orchard without losing any time in the field.

This problem before the Indiana farmer is acute and requires some careful thought but with good planning, good equipment and hard work it is possible for many farmers to produce good apples.

Many of the demonstration orchards in many parts of the state as well as many individual farmers who have tried to give good proof that it pays to care for the small farm orchard. One Adams county farmer made a net profit of $139.77 per acre on 28 trees. A Boys' Club in Whitley county averaged a net profit of $5.49 per tree where unsprayed trees were worthless. Another of the demonstration orchard men figures that he received $1.97 per hour for every hour spent in his spraying operations. This orchard of 20 trees gave a net profit of $332.50 per acre above expenses

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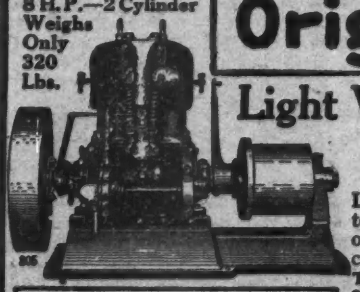

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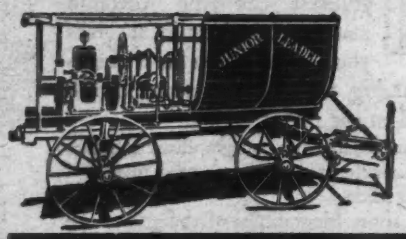

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How to Prune Trees

(Continued from page 5)

the outside to admit light sufficient to allow the development of fruit spurs and to color the fruit.

The average man has a tendency to cut out branches which cross, or are in any way objectionable. In many cases better results would be accomplished if the branch were simply shortened to a side branch. Suppose, for example, that a side branch had been left to fill in a space in a tree, and that this branch continues growth, growing across another branch some three feet from the first branch. Many men would remove this cross branch in its entirety, because they had been told to remove crossing branches. Does it not seem reasonable that this long cross branch could be cut back so as not to interfere with the branch it is crossing, and still fill the space that it was intended to fill?

Time of Pruning

Fortunately, the time of pruning corresponds to the leisure time of the fruit grower, and in the Eastern commercial apple producing sections, may usually be done during any favorable weather from early November to early April. However, slight preference should be given to pruning done during late winter and early spring because the wounds heal over very readily.

Some growers maintain that drying out or dying back is apt to result from early winter pruning, but the writer does not know of serious injury of this nature in bearing trees.

If one has a large acreage to prune, he should start work in the older trees during the early winter and reserve the younger trees for the late winter and spring pruning. As to the effect of pruning during periods of low temperature, it is believed that pruning done during any weather that is suitable for the pruner will result in no ill effects. However, it is possible that heart rot and dieback may result from pruning frozen wood.

A great number of dressings have been used upon wounds made in pruning and with varying results. The New York Experiment Station found that undressed wounds healed more rapidly than those whose surfaces had been protected. In case a grower desires to use a dressing, white lead or white zinc should probably be given preference. Certainly, it is not necessary to cover small wounds.

Pruning Tools

Two tools are absolutely essential for all pruning work: a pair of small hand shears and a saw. With these two tools a man can do practically all of the work that will be required in bearing trees and most of the work in young trees.

The shears should be made of the best material obtainable as cheap shears are easily sprung. A good pair of steel shears will withstand heavy work for several years. The shears should be from seven to ten inches in length—nine being the size usually preferred. Shears with coil springs are not desirable as the springs frequently "fly out" and are lost.

The saw should be so constructed as to cut rapidly; leave a smooth cut; be as light as is consistent with rigidity and good lasting qualities, and should have a grip that will not tire or cramp the hand or wrist. A saw in which the teeth are set to cut on the "pull" is less tiring. Saws with teeth on both edges are objectionable as they cut slowly and frequently injure the bark on the parent branch.

A pair of loping or wooden handled shears often facilitates the work about young trees and about the lower parts of young trees. They are somewhat awkward to handle in the upper parts of bearing trees. Such shears should be about 20 to 25 inches in length.

The pole pruners, six to ten feet in length, enable one to work the tops of trees five to ten years old to better advantage. They should not be used where it is possible to work with other tools because the work with a pole pruner is, at best, very slow and the cutting cannot be done as precisely as with other tools.

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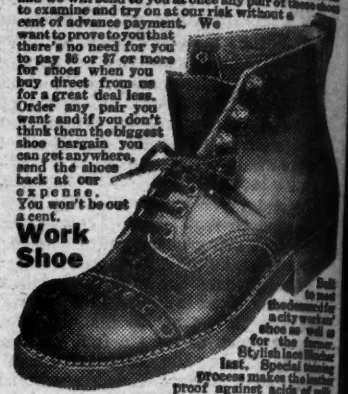

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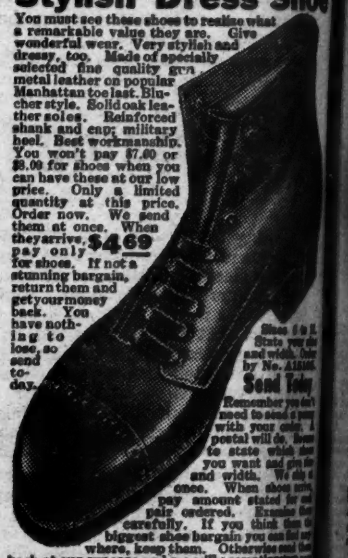

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The Georgia Peach Industry

By N. P. Bassett, Georgia

THIRTY-ONE years ago the Georgia peach industry was in its infancy. There were no large orchards and few small ones. At that time Mr. J. H. Hale had begun his orchard at Fort Valley, which later developed into one of the largest in the state. Mr. Samuel H. Rumph, originator of the Elberta, was also producing quite a large amount of peaches at Marshallville, Ga. Very few peaches were shipped from the state before 1889 when the first large crop was harvested and sold on the northern and eastern markets.

The possibilities of the great Elberta and some other prominent varieties were brought to the attention of our people by such men as J. H. Hale and Samuel H. Rumph. The former planted the first large orchard and might well be called the father of the Georgia peach industry. Then quite a number of northern men bought up land around Fort Valley and made large plantings. After these leaders harvested a few crops which yielded them handsome profits, the native Georgians were not slow to follow suit and make the most of their opportunities.

In Houston county, the focal point of the central peach producing section, land values increased by leaps and bounds. Cotton, formerly the most important money crop, soon fell into insignificance and the greater part of the good lands was planted in peaches. The shrewd natives soon ousted most of the northern growers and became the leaders themselves. Of the original planters, Mr. J. H. Hale is the only one who continued in business around Fort Valley. He was always able to hold his own.

The peach fever became contagious and quickly spread to adjoining counties and thence to various sections of the state. About nineteen years ago the industry was given another impetus by the introduction of the Hiley peach, one of the comparatively early varieties. The market received it very favorably and many thousands of these trees were planted. Large orchards of this variety soon were seen everywhere. The Hiley is a beautiful peach, packs ideally, is a good shipper and commands a good price. It will always occupy a prominent place among the varieties grown in Georgia. Then the Belle of Georgia, grown for many years and unexcelled for beauty and quality, and the Mayflower, of comparatively recent introduction, have played no small part in the advancement of peach interest.

Wherever the commercial peach has found its way, there progress and prosperity are found. In my own county of Houston, many small farmers who, before they planted peaches were scarcely able to make a living, are now riding in automobiles and have a neat sum of money in the bank. Of course there have been quite a number of failures but the great majority of growers have been successful and some have accumulated large fortunes.

If the old orchard is given just a fair chance, it will generally show profits that will look mighty good to the owner who has doubtless been considering grubbing out the trees for some time.

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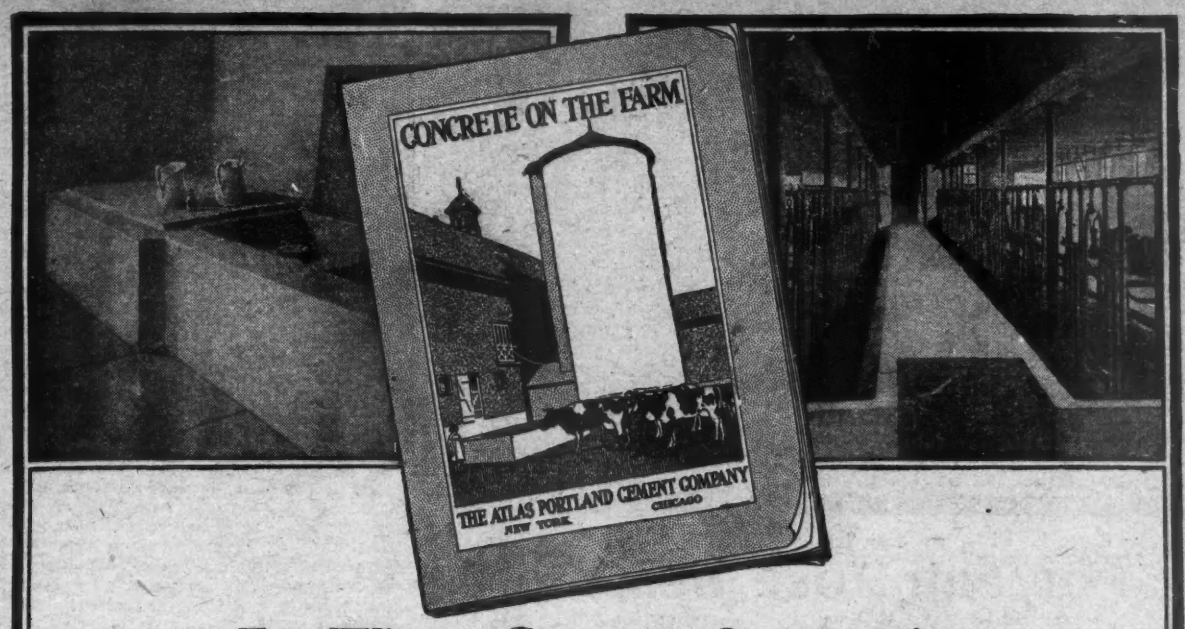

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ATLAS Cement can be used successfully for indoor concrete construction during the Winter months, particularly when there is little other work to keep farm help busy. Send the coupon below to our nearest office for our books "Concrete On The Farm" and "Concrete on the Farm in Cold Weather" which tell what and how to build with ATLAS.

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Now is the time to build your indoor cooler. Then when warm weather overtakes you, it will be ready to keep milk cool and sweet. The protection afforded against loss will save many times the cost of the few bags of ATLAS required. Build now—in spare time.

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Built with ATLAS Cement they not only prevent food waste but permit cleaner, weight-producing food consumption. Easily kept clean and sanitary—and are permanent.

Another suggestion; concrete your cellar floor this winter. Make it warmer in winter, cooler in summer and dry always.

"The Standard by which all other makes are measured"

The Atlas Portland Cement Company

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Please send me a copy of "Concrete On The Farm" and "Concrete On The Farm in Cold Weather" without cost or obligation. B

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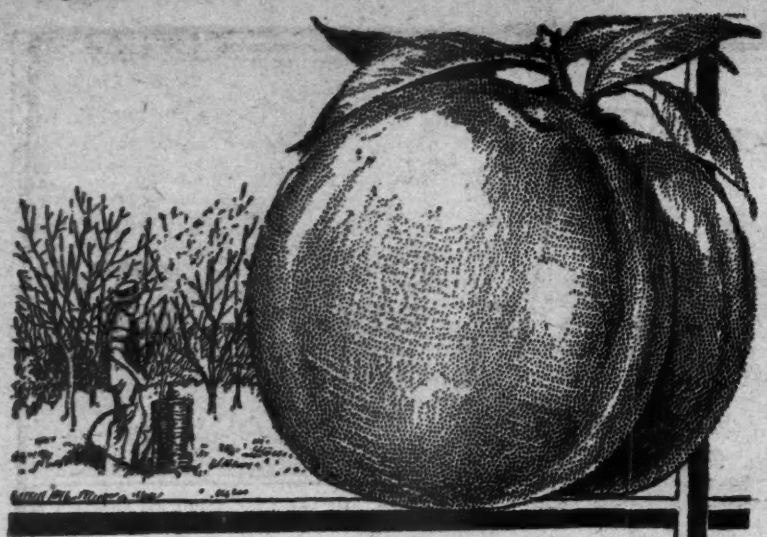

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Let our experts guide and direct you in controlling this and other scale pests. Our 20 years' experience will keep you from going wrong—will make your spraying effective. It is a free service we are giving fruit growers. Don't hesitate to write us. Scale insects can only be controlled by dormant period spraying. Now's the time—on mild days. Spray your trees with

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The Orchard Brand includes a full line of spray materials—Atomic Sulphur, Arsenate of Lead, Arsenate of Calcium, Arsenite of Zinc, standardized Bordeaux preparations, Lazal for potatoes, etc. A complete line of Insecticides and Fungicides for growing period as well as dormant period spraying.

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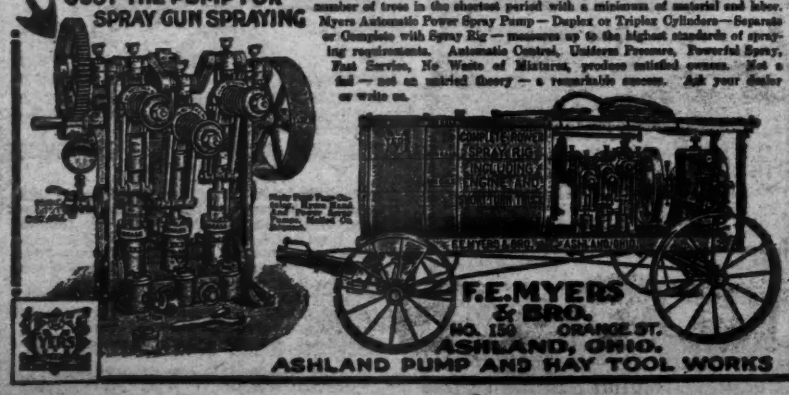

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ASHLAND PUMP AND HAY TOOL WORKS

Success on Three Acres

By Campbell L. Cory

IN 1907, Bolton Hall wrote a book entitled "Three Acres and Liberty," in which he points out the benefits and pleasures on a few acres of land. He tells of the actual results obtained by thrifty, intelligent people and figures prices, some of which are: Beans 5 cents a pound; peas 8 cents a pound; cucumbers 1 cent each; onions 5 cents a pound; cabbage 5 cents a head, and so on. In the poultry section he calls attention to eggs often going to 50 cents a dozen. In the bee section he refers to instances when honey has sold as high as 10 cents a pound. In the same book in connection with fruit, Mr. Hall states that the top price for apples often reaches 75 cents to $1.00 a bushel. He always adds that these are extreme prices and are the goal to which would-be suburbanites may expect to reach by careful, painstaking work and management. To read this book makes one think of fairy tales or something of the sort.

But at Maumee, Ohio, E. A. Heaton, originator and breeder of Money Maker strain of White Wyandottes, lives on a beautiful three acre place, which is about as near "Three Acres and Liberty" as it is possible to get, particularly when one compares the prices obtained in 1907 and the prices today. "Heaton Park," as Mr. Heaton lovingly calls his place, is located on one of the main cement roads leading into Toledo and it is devoted entirely to fruit and poultry, with of course a small family garden. The poultry runs are among the fruit trees, which makes a fine combination, while for a front yard Mr. Heaton has a beautiful forest park of oak, ash, elm and hickory.

Produce from "Heaton Park" is all sold at the door, especially as an electric line passes in front of the house, but the same thing can be done from almost any farmhouse nowadays. Prices of eggs range from 50 cents per dozen and upwards in summer to 80 cents a dozen and over in winter, heretofore. Mr. Heaton expects they will reach $1.00 or perhaps $1.25 a dozen this winter. Mr. Heaton is general agent of a steamship company in Toledo and his three across of poultry, fruit and flowers is in a great measure a hobby, although it is his home. He runs his place however on business principles. Eggs are sold for hatching and Money Maker White Wyandottes are shipped everywhere for breeders.

A fine crop of peaches, plums and some other fruit was produced this year, while the garden produced beans, peas, tomatoes, lettuce, etc., for home consumption. When one now thinks of tomatoes at $1.25 per bushel, beans at 25 cents a pound, cabbage at 25 cents a head, honey at 30 cents a pound, and apples $4.00 a busel, surely three acres of fruit, with a fine poultry business established, besides a garden, is about as near liberty as it is possible to get in this sick old world.

Get More Eggs; Save Feed

Egg prices are high and going skyhigh—higher than ever before. Those who know how and what to feed to get the most eggs all winter and spring will reap big profits. Improper feeding methods will result in fewer eggs, wasted feed—loss and disappointment. Prof. T. E. Quisenberry, Director-in-Chief of the great American Egg Laying Contest, and officially recognized as one of the world's greatest poultry authorities, has just completed a 16-page bulletin on "How to Get More Eggs and Save Feed." He will mail this bulletin to readers of the American Fruit Grower who will write him without delay. Send no money. Over a thousand hens under Quisenberry's direction laid from 200 to 304 eggs each per year. He just finished making a profit of $6.15 per hen in nine months on commercial eggs from one large flock. Write him today for his free bulletin, addressing care of American Poultry School, Dept. 481, Kansas City, Mo.

160 Hens 1500 Eggs

Mrs. H. M. Patton, Waverly, Mo., writes me: "I have fed two boxes of 'More Eggs' to my hens and I think they have broken the egg record. I have 160 white Leghorns and in exactly 21 days I got 125 dozen eggs." Any poultry raiser can easily double his profits by doubling the egg production of his hens. A scientific tonic has been discovered that revitalizes the flock and makes hens work all the time. The tonic is called "More Eggs". Give your hens a few cents' worth of "More Eggs" and you will be amazed and delighted with the results. Now is the time to give "More Eggs" to your hens while prices are high and profits big.

$1.00 Package FREE

If you wish to try this great profit maker, simply write a postcard or letter to E. J. Reefer, the poultry expert, 8651 Reefer Bldg., Kansas City, Mo., and ask for his special free package $1.00 offer. Don't send any money. Mr. Reefer will send you two $1.00 packages of "More Eggs." You pay the postman upon delivery only $1.00, the price of just one package, the other package being free. The Million Dollar Merchants Bank of Kansas City, Mo., guarantees if you are not absolutely satisfied your dollar will be returned on request. So there is no risk. Write today for this special free package offer.

Poultry Raisers Everywhere Tell Wonderful Results of "More Eggs"

"More Eggs" a Godsend

I received your "More Eggs" Tonic and found it was a great Godsend. I was only getting 12 eggs a day, and now I am getting 50 per day.
MYRTLE ICE, Boston, Ky.

"More Eggs" Paid the Pastor

I can't express in words how much I have been benefited by "More Eggs." I have paid my debts, clothed the children in new dresses, and that is not all—I paid my pastor his dues. I sold 42½ dozen eggs last week, set 4 dozen, ate some, and had 1½ dozen left. MRS. LENA McBROON, Woodbury, Tenn.

1200 Eggs from 29 Hens

The "More Eggs" Tonic did wonders for me. I had 29 hens when I got the tonic and was getting five or six eggs a day. April 1st I had over 1200 eggs. I never saw the equal.
EDW. MEKKER, Pontiac, Mich.

"More Eggs" Makes $300

I used "More Eggs" Tonic during the winter, I was able to sell $300 worth of eggs. Good result!
JOSEPHINE BEVARD, Derby, Iowa.

$200 Worth of Eggs from 44 Hens

I never used "More Eggs" Tonic until last December; then just used one $1.00 package and have sold over $200.00 worth of eggs from forty-four hens. "More Eggs" Tonic did it.
A. G. THODE, Sterling, Kans., R. No. 2, Box 61.

1368 Eggs After 1 Package

Last fall I bought a box of your "More Eggs" Tonic and would like to have you know the result. From January 1st to July 1st my hens laid 1368 eggs.
A. E. WHITE, Scranton, Pa.

Increase from 8 to 36 Eggs

I am well pleased with your "More Eggs" Tonic. I was only getting 8 or 9 eggs a day—now I am getting 3 dozen a day.
WM. SCHMIDT, Shady Bend, Kans.

Send No Money

Don't send any money; just fill in and mail coupon. You will be sent, immediately, two $1.00 packages of "MORE EGGS." Pay the postman upon delivery only $1.00, the extra package being FREE. Don't wait—take advantage of this free offer TODAY! Reap the BIG profits "MORE EGGS" will make for you. Have plenty of eggs to sell when the price is highest. Send today!

FREE $1.00 Package

E. J. Reefer, Poultry Expert, 8651 Reefer Bldg., Kansas City, Mo.

Dear Mr. Reefer:—I accept your offer. Send me the two $1.00 packages of Reefer's "More Eggs" for which I agree to pay the postman $1.00 when he brings me the two packages. You agree to refund me $1.00 if both of these packages do not prove satisfactory in every way.

Name.....

Address.....

.....

It Paid to Fertilize

By C. M. Baker, Wooster, Ohio

CO-OPERATIVE tests conducted in the hill orchards of southeastern Ohio by the Ohio Experiment Station show that fertilizers can be relied upon to rejuvenate old orchards. Experiments which now cover five years' time in this particular instance were with Rome Beauty trees which were 20 years old and in a very depleted condition.

Where 5 pounds of nitrate of soda, five pounds of acid phosphate and 2½ pounds of potash were used per tree, the average yield was 317 pounds, or a gain of 193 pounds of fruit per tree. On an acre this would mean a gain of 53 barrels, and at $7 a barrel, represents a net increase per acre of $371. The cost of increase per acre in this case was approximately $10. Where five pounds of nitrate of soda was used per tree the average yield per tree was 296 pounds, or a gain of 172 pounds per tree over the untreated section. This would be a gain of 47 barrels per acre, and at current prices of $7 a barrel it would mean a net increase of $308. The cost of treatment in this case was $6. The price per barrel may not average this for five years, however.

Other Fertilizers Tried

These tests also compare stable manure at the rate of 250 pounds per tree. No charge was made for the manure or cartage, so that the net increase was $308 per acre, the average yield per tree being 248 pounds of fruit, or an average gain of 44 barrels per acre. Where tankage furnished the source of nitrogen and bone the phosphorus, used in connection with 2½ pounds of muriate of potash and the tankage and bone five pounds each per tree, the results were not so satisfactory as where nitrate of soda and acid phosphate were used in connection with potash. With the tankage-bone-potash combination, the average yield per tree was 163 pounds of fruit, or a gain of 39 pounds of fruit to the tree. This represented a gain of only 10 barrels of apples, with a net increase valued at $70 per acre, at current prices this year.

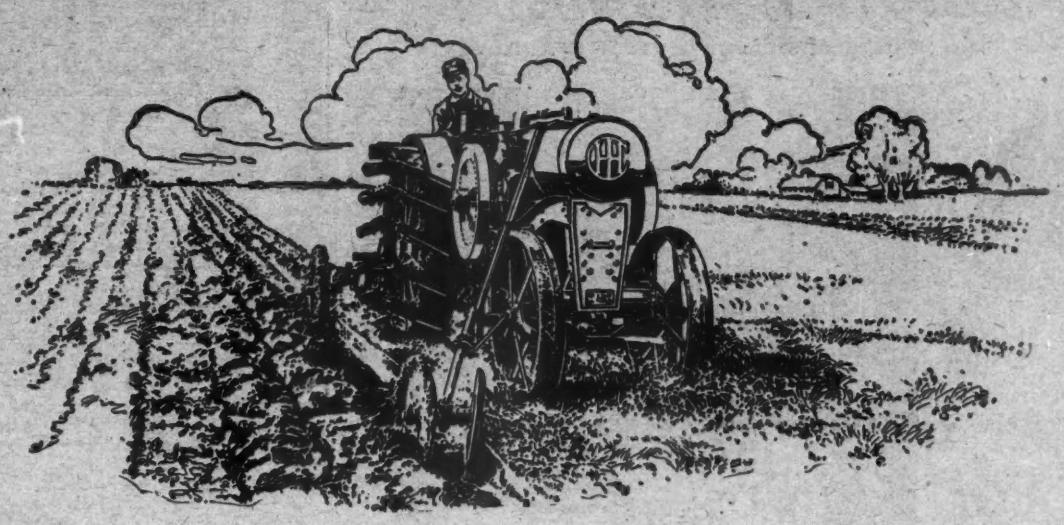
Muriate of potash alone, at the rate of five pounds per tree, returned only a net increase of $35 per acre. On the check plot the average yield per tree was only 124 pounds of fruit.

No Fertilizer Gave Small Crops

The production of mulch material in this same orchard from the results of these fertilizers is important. Where the annual fertilizer treatment per acre consisted of 250 pounds of nitrate of soda, 350 pounds acid phosphate and 175 pounds muriate of potash, this representing the cumulative amount when the trees were fertilized with a 5-5-2½ formula, the yield per acre in pounds of dried hay was 3,458, the fertilizer being applied on the original sod and no seed of any kind applied. Where acid phosphate at the rate of 350 pounds and muriate of potash at 175 pounds were applied, the yield per acre was 2,884 pounds of red clover, and where acid phosphate alone at the rate of 350 pounds per acre was applied, the yield of red clover amounted to 2,716 pounds. Where no fertilizer was applied the yield of hay per acre was only 840 pounds, this being mainly poverty grass and weeks.

From this work then it may be deducted that acid phosphate is a particularly valuable fertilizer for the orchard as it encourages the growth of red clover, which in turn, when being allowed to lie on the ground where cut, will supply abundant nitrogen for the apple trees.

Along with the pruning and spraying of the trees, should come the improvement of the soil. This should be delayed until the second year, for the reason that the trees will be very much surprised with the care given them and will be stimulated in growth. If the ground is cultivated, they are liable to grow late in the fall and as a consequence many will winter kill. If the land washes badly, it will probably be best to use the sod-mulch system, using a mulch of manure or straw on the sod.



The Sensible Leader of the 1920 Tractor Field

NOWADAYS the chug-chug of the farm tractor is heard in every corner of the land. Tractors are at work in the fields of many thousands of farms and if you look them over you will find them a mixed lot.

Tractor farming is still in its youth. Novelty is still in the surge toward power farming.

The impractical theorists are still in the ring, limping but not out of the running. Adventurers who swarmed into what they termed the "game" are still "playing." The hazards facing the farmer in search of reliable power are many.

In all this turmoil, one tractor like a steady star has lighted the way. That tractor bears the trusted name—**Titan 10-20.** It has led because it is the product of practical builders of good farm machines; because it is backed by many years of experience and unquestioned reputation.

Today **Titan 10-20** is the standard-setter among all tractors. During the past year it has been the topic of conversation on the tongues of farmers and tractor makers the nation over.

Selling at the popular low price—**$1000 cash f. o. b. factory—Titan 10-20** faced a sensational demand. A few months ago this desire for Titan ownership had flooded the factory with thousands of orders which could not be filled at once, though a new Titan was being turned out every few minutes.

Every effort is being directed to greater production and to continued Titan 10-20 pre-eminence during 1920. In view of manufacturing difficulties however, this is earnest advice to the intending purchaser:

Orders for Titan 10-20—and also for International 15-30 and International 8-16—must be placed far in advance. No other course will assure delivery.

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Although there is a shortage of fruit trees this spring owing to the fact that it was impossible to import as many seedlings during the past four years, those we have measure up to the Maloney Standard, and we will ship all orders in the order in which they are received. So we advise you to place your order early.
Frodonia, Pa., Oct. 10.
Enclosed order is for the famous Hepting Orchard of which there are 800 flourishing young trees, all of the Maloney Bros. & Wells product, and the finest in the Community. Respectfully yours, R. W. Moon.
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Small or large orders get the same attention. It will pay you to send for our Free Wholesale Catalog; it contains valuable information on fruit and shrubs and saves you money—write today. We prepay transportation charges on all orders for over $7.50.
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After several years' trial in both our test and commercial orchards, we unhesitatingly recommend the Ray as a money-making early peach. Plant it freely.

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have a fine stock of peach trees in Ray, Belle of Georgia and 20 other leading varieties. Also Apple, Pear and Cherry Trees and Small Fruits. All Harrison Trees are grown under our personal supervision and the budsticks are cut from our own *fruiting* orchards.

Harrisons' Evergreens grace the smallest lawn and the largest estate. Other Harrison Ornamentals include Norway Maples, Thunberg's Barberry and California Privet. Send today for 1920 Catalog.

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HARRISONS' NURSERIES Box 52 Berlin, Maryland

Kindly mention American Fruit Grower when writing to advertisers

BEAUTIFYING THE HOME & GROUNDS

By Mary Lee Adams

Winter Gardens in Florida

A HAPPY New Year to you and may you have the best-ever in the way of a garden this season. I presume you are not very busy with rake and trowel these days, but are taking your exercise on the ice or shivering indoors with all your outdoor wraps on and speaking bitterly of the coal shortage.

As for me, a kindly fate has led me, in this coldest of months, to summer climes—to Florida, which is, being interpreted, The Land of Flowers. Here I can feast my eyes on blossoming gardens and myself on oranges and luscious tangerines. For bare branches tossing against a chill, gray sky, I see tall heads of plam and pine lifted into the burning blue, and softly waving banners of silvery moss trailing from over-arching live-oak boughs.

Instead of Christmas berries there are myriad globes of golden fruit; for ice-bound streams, the soft ripple of the river and, in place of chilblains, mosquito bites. But dear me! I shouldn't go so far as to mention the serpent in this paradise. Maybe it will keep you from absolutely dying of envy, but I should add that the lightest breeze seems to wreck the misquito fleet and here, on the broad Indian river, there is always a light, sweet breeze.

Some Tropical Scenery

California readers might feel at home in similar surroundings. Here the brilliant bloom is set against a background of tropical trees and shrubs that enhances its beauty fourfold. One may learn quite a bit from some of the most successful of these gardens, and the first thing to impress us is the very evident fact that circumstances alter cases.

In the pre-eminently picturesque town of old St. Augustine, there are glimpses to be caught through gateways, of enchanting gardens the planting of which violates many accepted rules of landscape design, and yet they are gardens to dream in. It is at once noticeable, in this land of perpetual summer, that abundant shade is essential, not only for comfort but, possibly through subconscious mental association, even for appearance. The eye demands heavy greenery and generally gets it.

Another obvious thing is that, no matter how luxuriant the shrubbery, how stately the trees or how brilliant the blossoms, bare ground beneath them is not in keeping with the garden spirit and it strikes an unpleasant note. In this matter of grass the gardener in more northern climates has greatly the advantage. It is a struggle to get a good turf here and perhaps only the wealthy succeed, but there is a coarse native grass, undaunted by sand and shade, that, though hardly attractive in itself, yet makes a satisfactory green mat for setting off shrubs and flowers to advantage. Even dry grass or a carpet of fallen leaves serves to mask the staring, bare soil and relieves the eye.

Southern Beauty in Gardens

These gardens are fascinating by day, and by night, under a moonlight so brilliant that it is easy to read by, they are breathing beauty and romance embodied. Yet they are no lovelier than our more northern gardens, they merely strike another chord. We are not disloyal to our old loves in music if we welcome a strange, new and wonderful composition. We return to the dear, familiar themes with appreciation deepened and broadened by contact with something different.

If you do not know Florida, look through my eyes at a typical Indian river home and see how it compares with your own. Let us choose for our point of view the roadway, quite over-arched with boughs, that winds along the river bank before the home grounds. We look out over a broad expanse of smiling blue water, whose farther shore is nearly two miles distant. The low rocky bank is thickly set with tall palms inclined over the water as if to gaze at the reflection of their proud tufted heads. Among them stand the boles of great live-oaks with long spanish moss floating from their twisted limbs, and there are polished domes of magnolias and heaven-pricking needles of the long-leaved yellow pine.

The garden grounds repeat these growths in grove-like effect. The house itself is of the bungalow type, picturesque and suitable to its surroundings. Long and low, many windowed, hospitable, with timbered walls of creamy plaster against which vivid poinsettias flame to the height of six or eight feet. Bananas with broad, light green leaves two yards long, clump against one wing. Peeping round the other, a golden gleam set in glistening green hints at the orange gove behind. Is this grove, with its showy fruit and fragrant blossoms, more beautiful than our apple orchards of rose and snow in springtime and ruby fruit in fall? Why compare two perfect things? The wise way is to enjoy both to the utmost.

Plants of Many Varieties

The ground of the garden we are looking into, is green with a fine tender growth suggestive of young grain, growing bravely in sun and shade. All over it (and here you perceive a violation of the cardinal rule as to keeping the lawn open) grow trees and blooming plants. To be sure, there is some touch of formality in the handsome little sago palms that edge the path of approach, and another in the hedge that borders the river road.

This hedge is one of the prettiest possible. It is formed of the scarlet honeysuckle, trimmed to about four feet and growing upright, close and dense. The foliage is fine and tufty and it flowers freely in large clusters of coral-red honeysuckle blossoms. This is an accommodating plant in its habit of growth, standing erect as a shrub in the open or trailing as a vine over trellises when not cut back.

The house, of course, is draped in vines, but not too heavily. A great boughainvillea shades one end of the broad veranda and hangs, a pinky-purple curtain, from eaves to turf. The porch pillars are wreathed in blooming roses. Rivaling the honeysuckle hedge in beauty, and far more imposing in height, is the tall line of thick feathery bamboo that forms the side boundary.

Some Lovely Shrubs

Pink and white oleanders are clumped against this bamboo hedge, with here and there, for accent, a stiff Spanish bayonet or a century plant lifting its candelabra-like spike of bloom fifteen feet in air. Delicate mimosas contrast strikingly with the stiff rigidity of these, and here is a dear, old friend of ours, the white spirea, looking cool and sweet and "homey" against this exotic background. Over its snowy sprays hangs an unknown shrub with berries that resemble large bunches of orange-colored grapes. The whole splendid mass of shrubbery is filled out with other strange and decorative plants.

None but a native or a nursery-man could tell you the names of all these interesting growths, but this makes no difference because you couldn't stick them in the apple belt for they wouldn't grow there so you will not be ordering any for spring planting.

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Marketing Apples in Michigan

By the Owner of the A. B. C. Orchards

WHEN a fruit grower has come to the conclusion that he is a manufacturer of food material whose workshop is in the open air and that he has to protect his products against the elements and unforeseen actions of nature he has the basic idea on which his success depends. But this accomplishment as a grower does not necessarily mean financial success. As a man may be an excellent shoe manufacturer and a very poor banker, so a fruit grower may be a first rate apple manufacturer but an inefficient salesman. If the grower's crop is a small side-line of general farming he may possibly find it to his advantage, (referring to Southern Michigan) to deal directly with the consumer provided he can make quick deliveries by auto truck on good roads and can come into personal contact with his customer.

However, if he has to deal with them by express deliveries he will probably be annoyed by the frequent robberies, delays and damages to the packages so that even if he succeeds in collecting all claims his temper and christian behavior will suffer.

Regular transactions with retail trade may prove profitable for apple growers who have a sufficient quantity of different varieties for sale but for most of them the detail work connected with this method is apt to outweigh the advantage. It may also happen that these customers are not sufficiently acquainted with varieties and that duplicate orders are sent which the grower is unable to fill. The customer then is more apt to remember his disappointment than previous satisfaction which injures their business relations.

Shipping to Commission Men

Very largely the outlet for his product is the consigning to commission houses in the cities. To make a success of this the first requirement is to establish mutual confidence that will last. If this is done the eternal cry of dishonest packers and greedy commission men will not be heard in their transactions.

It seems regretable that the constant recommendation of "honest" packing goes through most talks about this subject. This term presupposes intentional dishonesty to which apple growers should object. If we claim to be business men the expression "reliable packing" seems to be more fitting. Any man who assorts the same fifty bushels (orchard run) of apples on two consecutive days will not pick out exactly the same number of fancies, first, seconds or culls and still he remains an honest man. We do not sell apples to prove our honesty but to make a living, preferably a little more—like any other man who offers his wares for sale.

Assuming then that such relations have been established satisfactorily and that the volume of business calls for it, it will be good policy for the grower to advise the commission man properly what shipments he may expect. If possible he should also adjust the style of package to the requirements of the fruit. Some varieties must be classed as "very perishable" and others only as "perishable." A ripe Yellow Transparent needs more care than a Duchess; a Red Astrachan at a certain time may be considered a good table apple while the Colvert can hardly be called such. If the commission man does his full duty to the shipper, besides getting appropriate prices he will enlighten his customers at times about the merits of the different varieties as he sells them.

To Get High Prices

A successful Michigan fruit grower known to realize exceptional prices for his products was asked in a meeting for an explanation of this fact. He answered tersely "acquire a reputation and then live up to it." A very sound advise.

The above remarks apply mainly to summer and fall apples. When we go over to the later varieties which represent about 75 per cent of the total in this section and which do not go into consumption immediately our problems are different. We may conclude from trade paper reports and advertisements

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that most all commission houses of standing buy winter apples for their own account and we cannot expect in the long run that their interest in consigned goods will be the same as in their own property.

The average grower cannot afford to buy grading or sizing machines. The packing in the orchard has its objectionable features, he may run short of packing material and will always have more or less difficulties as an individual.

The solution for them is recognized all over by this time to consist in co-operative associations. In the town of South Haven, Mich., such a one was started six years ago. The president and vice president are growers of acknowledged ability, the secretary is equally at home in country life and business in its larger forms, the manager is an experienced fruit salesman with practical common sense for new conditions and has a capable office staff.

The board of directors, consisting of growers, bankers and a lawyer give generously of their time. The majority of the members do not belong to the class of chronic kickers and are willing to define co-operation as "concerted action without belittling individualism." They take their apples and other fruit to the central packing house, do not worry about disposing of them and receive the proceeds in due time, more often with a smile than with a long face.

Grades Are Standardized

The association works under the name of "South Haven Fruit Exchange" and follows the motto about reputation mentioned above. Its shipments are made almost exclusive in carload lots under their own brands, corresponding, as to apples in a general way with extra fancy, firsts, seconds and unclassified.

There is no necessity for a buyer to examine the contents of some ten barrels in a carload; if present he can watch the grading and packing in barrels, boxes, baskets, etc., by experienced men and women while he has a pleasant chat with the accomodating manager who sells him a reliably graded package for a dollar of full value. The buyer will not lose anything by leaving the noisy quarters with their machinery, driven by electricity for a little rest in the pleasant office.

It is generally conceded that the flavor of a great many varieties grown in this section is high grade, so that not only eye but also the palate of the consumer is pleased and the manager will take pleasure in demonstrating to the buyer the difference in taste between the mild Grimes Golden and the spicy Jonathan, this being more pronounced in our fruit than in irrigated orchards. He can advise him, if desired, about the keeping qualities of the different varieties and give all round general information.

For several years the exchange, as well as some individual growers exhibited some of their fruit in a well known large hall in this town frequented by summer guests who consider the exhibit a pleasant addition to their enjoyments.

With all these up-to-date facilities and advantages why do some growers sell their apple crop on the trees? This method may reduce their selling cares to a minimum, but is it sound business to sell goods that cannot be judged approximately as to quantity and quality? In some special cases it may answer the purpose, but how do the trees look, if a set of men, not controlled by the owner of the orchard try to finish the harvesting in double quick time?

With other recent changes the export of apples may be increased in the near future for which an exchange, if not too small will be better fitted than an individual grower.

May we not hope that such progressive features in conjunction with modern facilities of communication and more machinery that replaces handwork will tend to keep greater numbers of the younger generation in the business of food manufacturing instead of their flocking to the overcrowded cities?

May we not also claim that thus, aside of bettering our own status we contribute to the welfare and contentment of the nation.

Curtaining the Windows

NEVER have we been given greater scope in individual taste in window draperies than this year—variety in color, materials and modes of hanging to meet the demands of the most simple or elaborate idea.

Before doing any buying there are many things to consider which in the end will make it all very simple—the kind of curtains, most suitable to the window, the length; the width of hems; valances or no; how to curtain casement windows; whether to have roller shades and how to hang the curtains over them, all crowd into the decision.

When possible roller shades are being discarded. While useful, they have never been a thing of beauty and it is considered now more decorative and just as practical to use an extra pair of curtains. These should be the same length as the overdrapes, hang on a separate rod between the glass curtains and the overdrapes and are pushed back behind the overdrapes out of sight in the daytime. They are run on the rods by means of small rings to make it easy to pull them back and forth as they are drawn together in the evening.

Glass curtains always reach from the top of the window to the sills, are not tied back and are hung as close to the glass as possible. They are made of some light, often filmy material in any or every tone but white for rooms other than the bedroom. Voile, scrim, fibre silk, etc., are seen most often for these and many are made with plain hems and without trimming. Where no roller shades are used and only glass curtains and overdrapes used, the glass curtains should be of heavier material such as casement cloth, which though long in use still holds its own; Chinese punjab, or a self toned sunfast. They are trimmed with a narrow fringe, a ruching or a plaited frill about an inch in depth.

Two glass curtains may be hung at one window with division in the centre, this kind being essential if they are serving the purpose of both glass and draw curtains; or a single wide curtain may stretch across, in either case have the fullness scant.

The bottom and inside hems range from one and a half to two and a half inches and the hems on the outer edges one half inch. Where there is only one single curtain used a one and a half inch hem all the way around takes the place of the selvages.

The casings at the top should be as wide as necessary for running on the narrowest brass rod and should be made of several folds of the material to allow for lengthening when laundered.

Sheer fine dotted Swiss or muslin with a two inch ruffle is being used on many of the smart colonial homes in our suburbs and I notice that these are accompanied by cream casements or fillet net curtains on the lower or living room floor.

In buying the net get the Scotch twilled as it launders so much better and is less expensive than the finer quality. Voile glass curtains faced with bands of one of the colors found in the cretonne overdrapes are a clever conceit for a bedroom.

Instead of the heavy velours, we find a greater use of damasks, brocades and the lighter silks. Cretonne and poplin are still found in many of the living room, dining room and bedroom plans.

Bees and Fruit

Fruit growing and beekeeping belong together, and fruit growing absolutely requires bees for best results. The bees do the indispensable work of pollinating the blossoms of most all fruits, insuring larger yields and better quality. Every up-to-date fruit grower knows this. Beekeeping is easy to learn, small expense to start. Out of our 50 years' experience in beekeeping we can tell you how. Better fruit and a crop of honey will be your profit. Write us today, asking for our two handsome booklets, "Bees and Fruit" and "Beekeeping for Pleasure and Profit." Tell us if you have ever kept bees.

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DEAR CHILDREN:

Here we are again, making our best bow to a new year, a year in which you will have the best times ever, I am quite sure. Though the snow is on the ground now it won't be long until we will be out hunting wood violets and daisies. Next month, in some places, we may find a few crocuses. And, next month makes a whole year which I have been with you, doing my very best to amuse you. I have grown very fond of all my Fruit Grower children and hope to be able to write your stories for a long, long time.

Wishing you a Happy New Year, I am, with love,

EDITH LYLE RAGSDALE.
THE FRUIT GROWER, Chicago, Ill.

TANGLES

No. 23—Riddle.
Why is a plum pudding like the ocean?
No. 24—Riddle:
When is a bonnet not a bonet?
No. 25—What is the largest room in the world?

Answers to Last Month's Tangles

Anagram—No. 20—Harry.
Riddles—No. 21—Watch.
Riddle—No. 22—Churn.

TIP-TE-TOE GETS HER WISH

"I'm tired of living in a house all the time," cried Little Tip-te-toe. "I want to live in a tent like the gypsies do." "Do you, really?" asked a voice, a teeny-weeny voice, close to Tip-te-toe. "Yes, I do. Then I'd never have to dust the chairs. Or—"

"Very well," laughed the voice, "you shall have your wish," and, before Tip-te-toe could say "scat", she was lifted right up off the ground and went sailing through the air. In a minute she dropped down, oh, so very easily, right in the midst of a big camp of gypsies. The dogs began barking and jumping at her but the gypsie queen ran out and picked her up and carried her into the tent. Then the little girl began whimpering, for she did not like the looks of the gypsies one bit. "Hush up, Tip-te-toe," cried the queen, "and get to work upon my dress." Tip-te-toe was too scared to say anything so she picked up the dress and began sewing up the holes in it. But, the more she sewed the more holes there were in it. Just as fast as she finished sewing up one another appeared. And the queen kept on scolding the little girl and all the little gypsy children came and looked in at the tent. They were so dirty that it made Tip-te-toe sick just to look at them. Then they pocked sticks at her and laughed.

After a while the little girl began to feel very hungry; and, all at once, she remembered that mother was going to have apple dumplings for dinner. At the thought she began to whimper and cry. "What's the matter, Tip-te-toe?" cried a gay little voice. "I want to go home to my mother," sobbed the little girl. "I hate living with the gypsies." "Will you promise to never, never be naughty again?" asked Fairy Star-Heart. "Oh, yes, yes!" cried Tip-te-toe.

The next minute the little girl felt herself rising up, up, and as she opened her eyes there stood mother. "My little girl has been asleep," she laughed. But Tip-te-toe knew that she had been away on among the gypsies.

"PEANUTS"

(A Puppy Tale)
(Book Rights Reserved)

During the next few weeks something happened that did not please me one bit. For some reason, I never could quite understand, Buddy and Sis commenced going to a place called "school." Every morning the Mistress would wash and dress them in nice clean garments, curl Sis' hair and part Buddy's on the side and, after packing a nice little lunch in a basket, kiss them and send them to this place called school. I wanted to go, too, but the Mistress would not let me.

"For shame, Rex," she would say when I tried to steal away after them, "For shame, Sir! Do you want to leave Baby—who would look after her if you were gone?"

That argument made me ashamed—always. She had given me Baby for my very own and here was I, wanting to turn my own responsibilities over to someone else.

I did love Baby, too. Of course, I had known Buddy and Sis a lot longer than I had Baby, in fact, they were my first playmates. But Baby was mine. Of all the children I ever knew she was—and is—the sweetest. She has the bluest eyes and the reddest lips and the sunniest curls. And her skin! Why, apple blossoms are not so fair.

She is kind, too. Sometimes Buddy and Sis play pretty rough but never Baby. When she was a little bit of a trick and I would lie beside her she would sink both hands into my white coat but she never pulled. Sometimes she would lay her head on my side as I lay stretched out full length asleep (or pretending to be) and go to sleep herself. Then I would lie very still until she awoke or the Mistress carried her to her crib.

I always watched the gate for the other children, though. I soon learned that directly after a bell, somewhere, rang, it wouldn't be long until here they would come with a whoop and, after they and I had eaten a lunch, out into the orchard we would romp.

Cold didn't keep us in, either. Nor snow. My, the fun we had making snow men and boys! Then when the pond became frozen I used to haul the children on a little sled and that was great sport. Sometimes the Mistress would wrap Baby in her snug little coat and a lot of other things and I would haul her. I felt very proud and full of honor when she was the passenger.

Thus time passed.

Looking back over that happy period I recall two incidents in which Baby and I figured rather prominently.

One was the time I strayed away from her, only a little way, for I never got out of sight, and was recalled by her cooing cries.

"Pitty fing," she was saying, "pitty fing, pitty p'ay fing for Baby."

I saw her creeping toward the edge of the quilt, then something—instinct, I guess—made me trot closer.

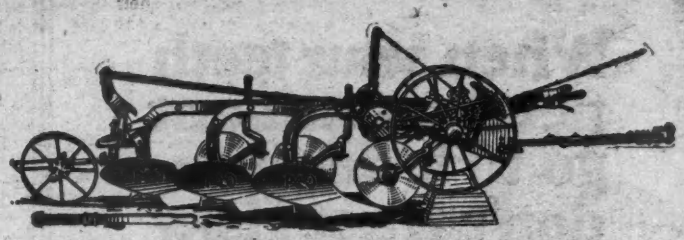
There, coiled, ready to strike, was one of the most venomous reptiles I have ever seen. I gave an agonizing yelp and sprang for it just as Baby reached her soft little hand to grasp it. But I was the quicker. I grabbed it as it reared to strike and before you could have counted three I had shook its head off!

At that Baby commenced crying, I guess she thought I was unkind in taking her "pitty sing."

The Master, who was at work in the orchard, heard the commotion and came running. I was still shaking what was left of the snake and I guess he sort of comprehended the situation for he sat down, limpy-like, on the quilt and grabbed Baby up to him. I could see he was badly scared for he commenced searching all over the little body to see if she were bitten. But she wasn't and when the Master knew for sure that she was all right he sobbed out loud and the great tears rolled down his cheeks.

"Oh, Peanuts, Peanuts," he cried, "you blessed, blessed old dog!"

I came over (I had dropped the snake)



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Little Genius
Power-Lift
Tractor Plow

Built for
Work in

Orchards and
Vineyards

Two Sizes
Three and Four
Furrow

10-inch Bottoms

THIS plow has a *low frame*, with *down-lying levers*, and is built especially to crawl around under the trees and vines of orchards and vineyards without catching and damaging the overhanging foliage.

It is made with a *narrow wheel tread*, the front furrow wheel being set in line with the rear bottom, and the plow can be run in as close to the trees as the conditions warrant.

The bottoms cut 10-inch furrows, consequently the three-bottom orchard and vineyard plow has practically the same capacity as two 14-inch plows. The small tractor that pulls an ordinary two-furrow plow will pull the three-furrow orchard plow with the same ease.

The Little Genius is a power-lift plow, and *one man operates both tractor and plow*, the bottoms being raised and lowered by one trip rope, placed within easy reach of the operator, who controls the plow from his position on the tractor. Both wheels can be raised for opening the first furrow to a depth of 8 inches. Wide tires prevent wheels from sinking into loose soil.

Has all the features of strength, simplicity of construction and ease of operation that have made all P&O plows just "a little better" than others.

The **International Tractor** and the **Little Genius Plow** are made for each other by the Harvester Company and they comprise the ideal one-man outfit. Ask the International dealer.

INTERNATIONAL HARVESTER COMPANY
OF AMERICA INC.
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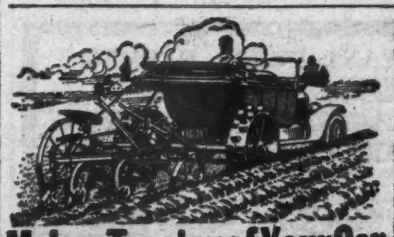

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COLGATE & CO., New York

and looked at him, trying to find out what I'd done.

"Peanuts," he sobbed, "you don't, you never can, understand what you have done today!" He hugged Baby and I and then I ran off, looking for the head. I found it after a while and it was still fighting. I barked and barked until the Master came and set his heel upon it and mashed it flat.

After that I was more watchful than ever and a good thing I was.

* * *

Along back in the summer there had been a band of gypsies camped in a little wood about a half mile from the house. They used to come up, once in a while, begging apples and one thing and another—in fact, their wants covered everything from a sewing needle to a pitchfork.

After a while the Master grew tired of their eternal begging and told them so. About the same time the citizens of the town ordered them to move on and, much to everybody's relief, they did. I had always hated those gypsies. They had such a crafty, mean look; they were so sneaking and so dirty that I raged every time one came near me. I had the greatest distrust of them and many were the times I chased them away from the orchard where they stole the Master's finest apples despite the fact that he allowed them all the down fruit they wanted.

(To Be Continued.)

THE COMMUNITY CLUB

There's a community club in your neighborhood, or at least there should be. Probably women are doing at least half the work in that club. One way of making the most of it and of getting something really useful in return for your labor, is to see what is being done in clubs elsewhere and then adapt it to your own needs.

The bulletin of a "Better Community Conference" held lately at Urbana, Illinois, shows the wide scope taken in by community workers. Many of the subjects discussed were not concerned with the needs of rural neighborhoods but, outside of these, a goodly list recommended itself to any one with the welfare of a rural community at heart.

Such subjects were "Community Recreation," "Sanitation and the School," "Vocational Education," "The Church and the Farm," "Better Homes," "Demonstrations in Cold-Pack Canning." There were talks by well-informed authorities on many subjects of particular interest to men, on pig clubs, on better farming and on the relation of the farm bureau to the new agriculture. An exhibition by architects of plans for schools, teachers' homes, community centers, etc., offered a great deal that was suggestive and for which there is generally abundant room in our rural districts.

Wouldn't it be possible for you to secure good speakers on some of these vital topics? Doubtless there are special subjects in which each locality is peculiarly interested. Fit your topics to the needs and interests of your own neighborhood, and your club will be a live and useful organization by which everyone will benefit.

HOUSEKEEPER'S EXCHANGE

By Edith Randolph

Orange peel grated, using only the yellow part and mixed with sugar and cornstarch, one tablespoonful of orange peel to two of sugar and one of cornstarch makes a good non-alcoholic flavoring. T. A. B., Oklahoma.

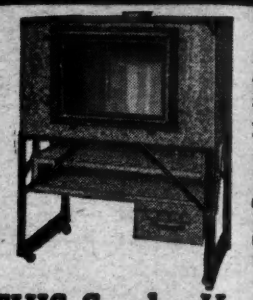
When dying materials with any of the varieties of dye soaps on the market, melt the soap before using and avoid spotting the garment to be dyed. The color will be more evenly spread through the goods also. H. E., Indiana.

Freshen the old window shades by painting them on the inside a color to harmonize with the furnishings—to prevent the paint from cracking add two tablespoonfuls of melted wax to each quart of warm paint. W. B., N. Y.

A little lemon juice sprinkled over banana or apple in fruit salad will keep the fruit from darkening before it is served. R. G. O., Missouri.

The Virginia Red Apple Company has been formed with offices at Groseclose, Va. J. L. Wood of Bristol, Va., is president.

Smoke Your Own Hams, Bacon, Sausages



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No. 3107. A Smart Gown—Here illustrated is cut in 6 sizes: 34, 36, 38, 40, 42, and 44 inches bust measure. Size 38 will require 5¼ yards of 44 inch material. Width of skirt at lower edge is about 1½ yard. As here shown gray taffeta was used, braided with white soutache. One could have this in brown serge or satin, with worsted, bead or chenille embroidery. Black velvet with facings of ivory satin, or taupe duvetyn with old blue facings would be very attractive for this design.

A pattern of this illustration mailed to any address on receipt of 10c in silver or stamps.

No. 3102. A Comfortable Coat Model—Cut in 4 sizes: 4, 6, 8, and 10 years, was selected for this natty top garment. It is developed in brown wool velours with facings of velvet in a matched shade. The body and sleeve are cut in one. This style is good for velvet, serge, corduroy, plush and other pile fabrics. A six year size will require 2⅝ yards of 44 inch material.

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No. 3084. A New Frock for the "Little One"—For this style one could choose soft silk, poplin, repp, batiste, or nainsook; for service and utility, check or plaid woolen or gingham, chambray, or linen could be employed. The sleeve may be in wrist length with a band cuff, or cut short and finished with a "turnback" cuff.

The pattern is cut in 4 sizes: 2, 3, 4 and 5 years. Size 4 will require 3 yards of 27 inch material. Collar and cuffs may be of contrasing material.

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No. 3096. A Neat Dress for School or Home—Cut in 4 sizes: 4, 6, 8 and 10 years, was used for the pretty model here shown. It is nice for serge, or for plaid or checked mixtures and also for velvet, silk, voile, repp, poplin, linen and gingham.

Size 10 will require 3½ yards of 36 inch material.

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No. 3101. A Model Very Attractive for Slender Figures—Cut in 3 sizes: 16, 18, and 20 years, is here depicted. Blue crepe de meteor was used for its development, with bead embroidery for decoration. This would be nice in brown satin or crepe, with embroidery in colors. The 16 year size will require 5¾ yards of 36 inch material, with 3 yards of ribbon or material 5 inches wide, for the sash. Width of skirt at lower edge is 1½ yard.

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Send all orders to

American Fruit Grower, Pattern Dept.

CHICAGO

Afgco Cook Book

Ham and bread stuffing (for chicken or turkey).

1¼ cups cooked minced ham	1 egg
5 cups stale bread crumbs	1 cup chopped celery
¼ cup melted ham drippings	1 minced onion
	1 teaspoon poultry seasoning
	Milk

Mix ingredients in order given and moisten with a little hot milk being careful not to get it too moist.

Peach Cake

2 cups flour	3 tablespoons melted butter
½ teaspoon salt	1 cup milk
2 teaspoons baking powder	Cinnamon
3 tablespoons sugar	Peaches
2 eggs	

Sift salt, flour, sugar and baking powder together. Beat egg yolks until lemon tinted. Add with butter and milk to dry ingredients. Beat batter until smooth and cut and fold in the stiffly beaten whites. Turn into a one and a half inch pan and spread evenly to the depth of three-fourths of an inch. Drain syrup off of canned peaches, cut in quarters and arrange in parallel rows on batter. Sprinkle with sugar and cinnamon. Bake twenty-five minutes in hot oven. Serve hot with a sauce made of the peach juice or whipped cream.

Cream of Celery Soup

3 cups of outer stalks and celery leaves	4 tablespoons butter
1 pint boiling water	4 tablespoons flour
2½ cups milk	½ cup hot cream
1 slice onion	Salt
	Pepper

Cook chopped celery in water until tender. Turn into strainer and rub pulp through. Scald milk with onion, remove onion and add milk to celery. Melt butter in sauce pan, add flour, stir until smooth. Pour on hot mixture gradually. Add hot cream and seasonings. Serve in bouillon cups in which has been placed a tablespoon whipped cream. Sprinkle with paprika and serve with crisp crackers or croutons.

Carrot Timbales

4 cups scraped sliced carrots	2 eggs and 1 egg yolk
2½ tablespoons butter	Salt
Chicken stock or boiling water	½ teaspoon chopped parsley
	Pepper

Cook carrots ten minutes in butter stirring constantly. Cover with stock or boiling water and cook until tender. Drain and rub through a strainer. Add eggs slightly beaten and seasonings. Mix thoroughly and turn into greased timbal moulds. Set moulds in shallow pan, pour around hot water, cover with greased paper and bake 15 minutes in moderate oven. Serve with fried chicken or squab.

Smoked Halibut with Poached Egg

1 thin firm cut of smoked halibut	Poached eggs
Melted butter	Sliced lemon
Maitre d'hotel butter	Parsley sprigs
	Paprika

Soak fish flesh side down in cold water over night. Drain, brush oven with melted butter and broil over glowing coals or under a gas flame until delicately browned on each side. Place on hot serving platter, spread with maitre d'Hotel butter, surround with poached eggs, sprinkle with paprika and salt. Garnish with lemon and parsley.

Cabbage Nut Salad

3 cups finely shredded cabbage	¼ cup nut meats
	Lettuce
1 teaspoon salt	Sweet cream
1 teaspoon sugar	Boiled dressing

Season cabbage with salt and sugar. Add enough sweet cream to moisten. Add nut meats with a fork. Arrange on lettuce leaves and cover generously with boiled dressing.

Squash Biscuits

2 cups flour	1 egg yolk beaten
1 teaspoon salt	½ cup cooked riced squash
3 teaspoons baking powder	Cold milk
2 tablespoons shortening	

Sift flour, salt and baking powder together. Rub in shortening. Add egg yolk, squash and enough milk to make a soft dough. Cut and bake like ordinary biscuits. Serve hot with butter and honey.

Cornstarch Pudding

1 pint milk	2 eggs beaten slightly
2 tablespoons cornstarch	2 tablespoons sugar
	½ teaspoon vanilla
	½ teaspoon salt

Scald milk, add salt. Mix cornstarch with cold milk until it thickens. Remove from fire, cook, add egg, sugar and flavoring. Bake in buttered dish for thirty minutes.

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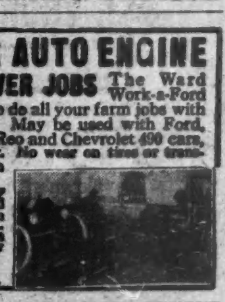

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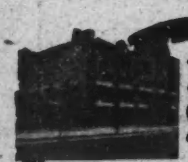

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The increasing number of men and women interested in bees, will be pleased with this splendidly printed book which so clearly tells the beginner how to start, what equipment is needed, how to construct hives, how to feed and care for the bees, how to breed better bees, where and how to sell, with many other essentials to the successful production and marketing of honey. Let no one scorn beekeeping as a merely commercial art. It is almost an avocation. The author, that delightful writer and enthusiastic lover of bees, asserts that few who have not the divine afflatus or (as he more sensibly expresses it) the "bee fever," will make a great success. Thousands are today improving both income and health by keeping many or just a few hives. The book contains 179 pages, including glossary and illustrations.

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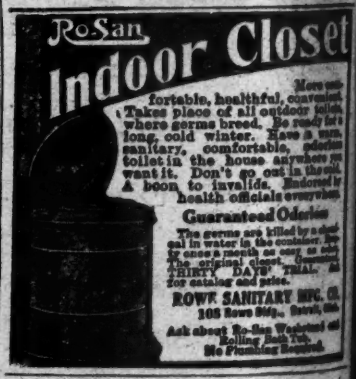

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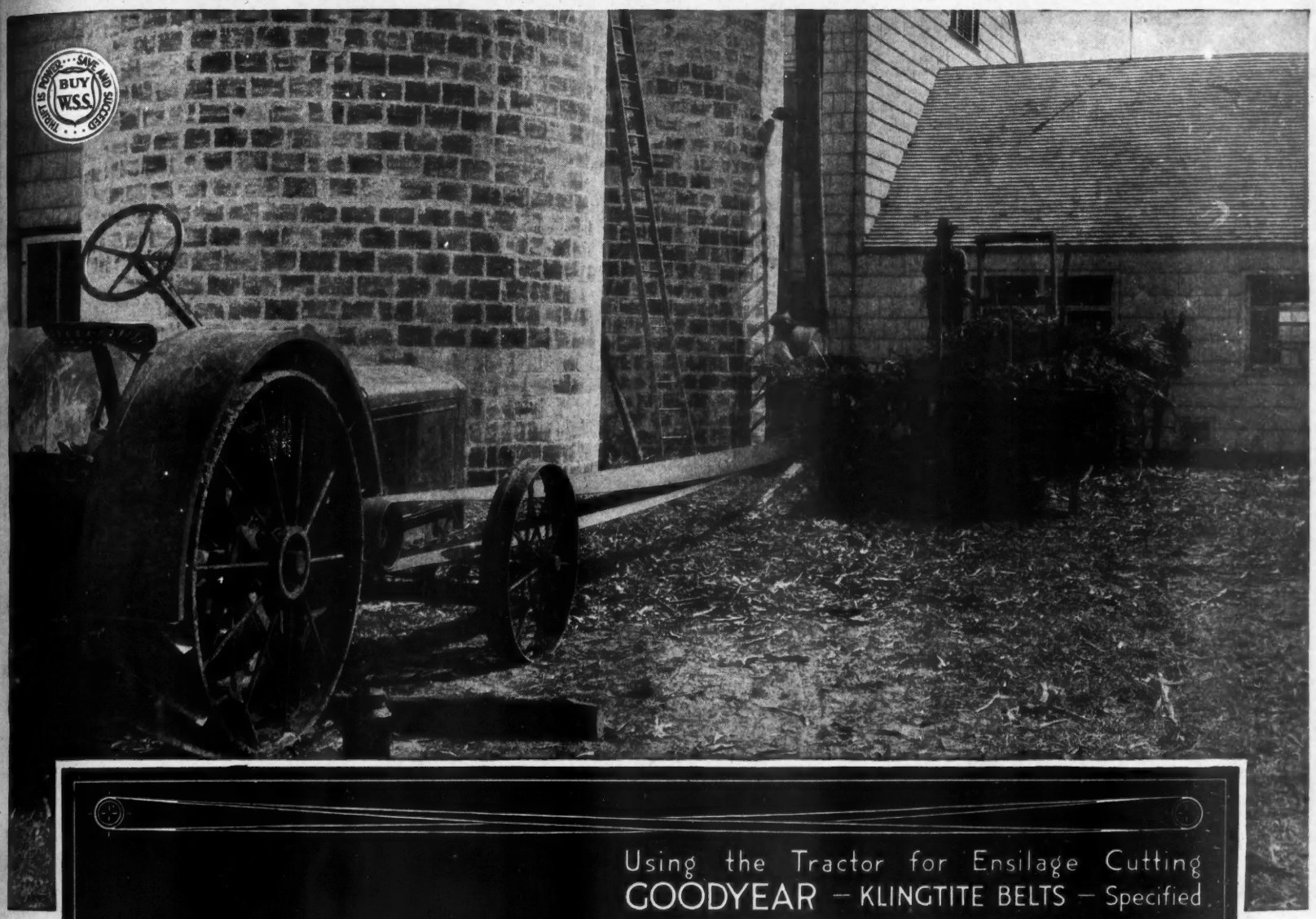

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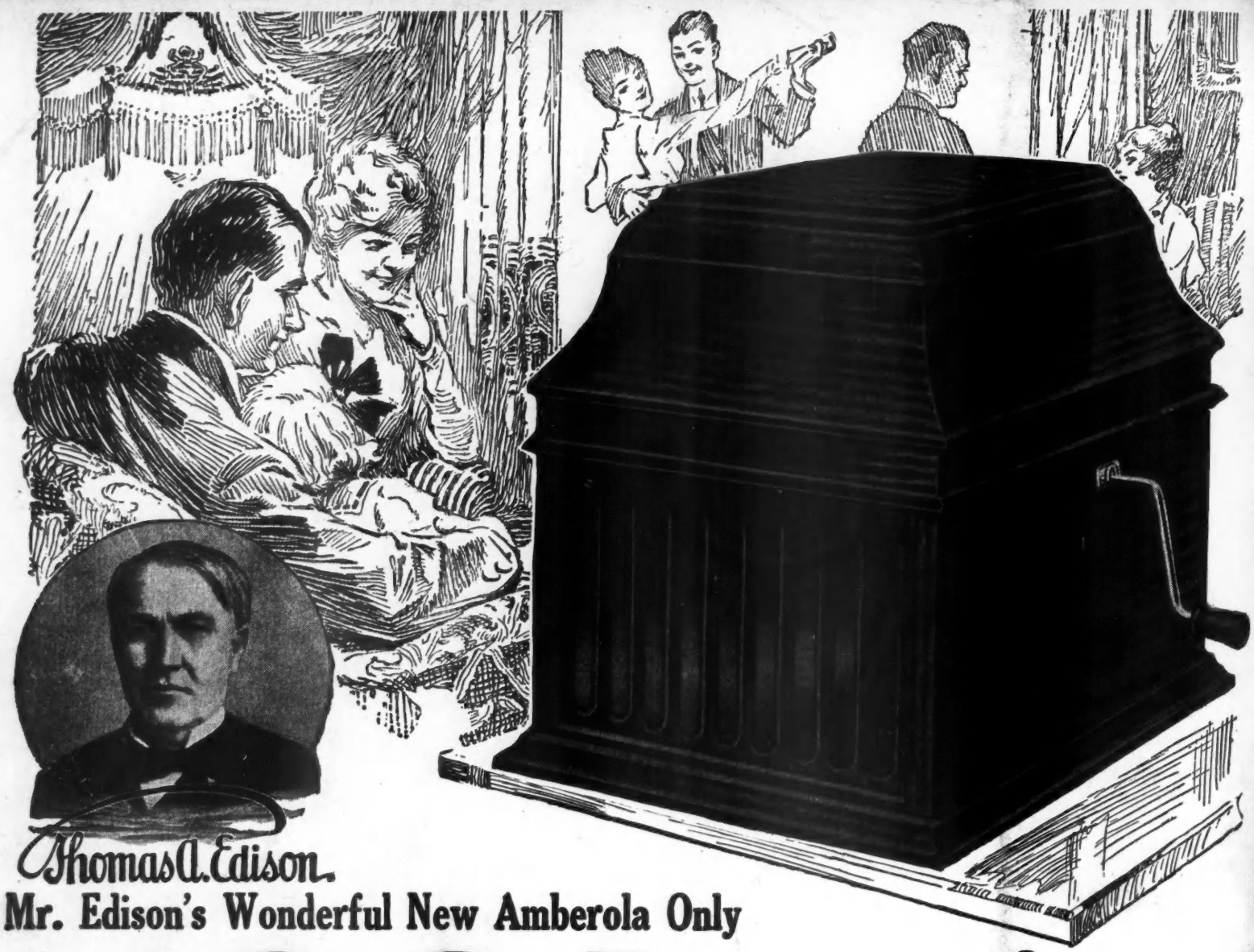

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